the Iron Age
A Chilton Publication
THE NATIONAL METALWORKING WEEKLY · AUGUST 4, 1955

What does the copper strike mean to you?
See page 35

THE KING'S ARMOURER

Most skillful of all the metal workers was the King's Armourer, sketched by our artist from an old steel engraving. With all the cunning of his craft, the armourer selected finest steels and fashioned breastplate and helmet for his liege, fitted them to his royal person, and kept them always bright and shining and in perfect repair.

Crafts and craftsmen through the ages

NUMBER ONE OF A SERIES

Enlargements of illustrations available upon request.

Basic Refractories not only furnishes its customers with the finest refractories available, but also employs skilled craftsmen —men with practical steelmaking experience— to insure that the use of these products gives full value.

BASIC REFRACTORIES INCORPORATED CLEVELAND 15 OHIO

REFRACTORIES ENGINEERING AND SUPPLIES LTD.—EXCLUSIVE CANADIAN AGENTS

BOLTING SPEEDS ERECTION of New Building in Dallas

30-story Adolphus Tower Building, Dallas. *Owner:* Dallas Hotel Co.; *Architect:* Wyatt C. Hedrick, Dallas; *General Contractor:* Henry C. Beck Company, Dallas-Atlanta.

This graceful new structure is the Adolphus Tower Building, a 30-story office building in Dallas, Texas. Originally its steel frame had been designed for riveted construction, and the two lower tiers were erected in this manner. But to speed up erection, Bethlehem High-Strength Bolts were used to join the remainder of the steel skeleton. This enabled the builder to meet the rapid erection schedule that had been set for the job.

Bethlehem High-Strength Bolts save installation time, and retain their full clamping force, thus providing permanently tight joints. They are particularly well suited for construction in hospital and school zones, as installation can be accomplished with minimum noise.

Bethlehem High-Strength Bolts are used with two hardened washers, and can be installed in holes drilled or punched originally for rivets of the same diameter. The nut is driven up to predetermined tension by a calibrated pneumatic impact wrench.

Bethlehem High-Strength Bolts are made of carbon steel in sizes to meet virtually every construction need. They are heat-treated by quenching and tempering, and meet every requirement of ASTM Specification A-325.

The nearest Bethlehem sales office will be pleased to answer your questions about the use of Bethlehem High-Strength Bolts. Call them today. Or write direct to us at Bethlehem, Pa.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

the iron Age

Vol. 176, No. 5 August 4, 1955

DIGEST OF THE WEEK

Starred items are digested at the right

THE IRON AGE, published every Thursday, with an additional issue in June, by CHILTON CO. (INC.), Chestnut & 56th Sts., Philadelphia 39, Pa. Entered as second class matter, Nov. 9, 1955, at the Post Office at Philadelphia under the act of March 3, 1879. Price to the metalworking industries only, or to people actively engaged therein, $5 for 1 year, $8 for 2 years in the United States, its territories and Canada. All others $15 for 1 year; other Western Hemisphere countries, $15; other Foreign Countries, $25 per year. Single copies, 50¢. Annual Review Issue, $2.00. Cables: "Ironage," N. Y.

Address mail to 100 E. 42 St., N. Y. 17, N. Y.

NEWS DEVELOPMENTS

GERMAN REARMAMENT FACES TOUGH HURDLES—P. 38
Germans agree that a defensive army is a must. But to divert men and production to mobilization would put a serious dent in their civilian economy. Germans insist the NATO plan for full development by 1959 won't work. They say the ambitious aim of four armored divisions, four mechanized divisions, four infantry divisions and a 12-wing air force is closer to 12 than 4 years away.

SINTERING ASSUMES ADDED IMPORTANCE — P. 39
Heavy demand for more hot pig iron forces steel mills to turn to sintering plants for added production. Blast furnace operation increased as much as 10 pct with coke consumption down.

WOC PROBES HIT BUSINESS TRAINING — P. 40
Investigations of the program under which businessmen serve without pay in government posts are endangering this mobilization measure. Probers charge businessmen act for their companies against government interests. Charges appear politically inspired but won't make it any easier to find able men willing to come to Washington.

WASHINGTON WORRIES ABOUT OHIO DEFENSE—P. 57
Tight concentration of industry and men in the northern Ohio area has defense planners concerned. An A-Bomb could make a serious dent in U. S. steel production, wipe out millions. Planners seek a special inquiry into evacuation and survivor care problems.

EAST BOOM KILLING WEST SHIPYARDS — P. 61
West Coast shipyards are dying of starvation while their eastern counterparts gorge themselves on the lion's share of government contracts. What can be done? That is what California's Governor Knight and his committee are trying to find out.

MACHINE TOOL SHOW POSES BIG PROBLEMS — P. 63
Enthusiasm created by coming Machine Tool Show leads some builders to wonder if exhibit shouldn't be staged annually. Objections to more frequent shows include development pace and cost. Current exhibits will cost even smaller companies about $50,000. Most demonstrators are sold later but shipping, handling and incidental expenses run high.

IN METALWORKING

ENGINEERING AND PRODUCTION

MACHINING STEPS TIED-IN AUTOMATICALLY — P. 75
Groups of machine tools operating at different rates have been combined into a continuous setup for the production of pinion gears. Parts are loaded, unloaded, gaged and sorted automatically. Individual machines stop automatically if several successive parts are off size. But the system as a whole continues.

ARC-CAST MOLY WITHSTANDS HIGH HEAT — P. 79
Larger sizes, higher density and lower gas content are the major advantages of arc-cast molybdenum. Add to this the unusual high temperature properties of molybdenum and the designer has at his disposal greatly improved materials for parts which must withstand high heat for long periods of time.

INVESTMENT CASTINGS SAVE IN NEW USES — P. 82
Small parts for assemblies are often produced more simply and economically by investment casting. Precision-cast dimensions and smooth finish also help solve tough machining jobs. Now, the process is cutting costs on items such as builders' hardware and similar products.

NEW WELDING CONTROL CUTS SCRAP LOSS — P. 84
A new automatic control system for an induction welding tube line measures strip thickness, stores this information while the tubing is being formed, then sets welding current accordingly. It saves thousands of dollars yearly by reducing the rejection rate on tubing.

ULTRASONIC TESTER SPEEDS INSPECTION — P. 87
Where both sides of a test piece are accessible, the ultrasonic transmission type tester offers the speed, simplicity and economy desired for production inspection. It evaluates the test piece by its ultrasonic conduction and gives a direct reading of acceptance or rejection of the part. It is nondestructive and the operator can learn to use it in a matter of minutes.

MARKETS & PRICES

COPPER IS NOW AT THE CRISIS POINT — P. 35
The lengthy copper strike has made an impossible supply problem for copper consumers. The metal was short even before the strike. Some fabricators have been forced to close down because they couldn't get enough metal. Price hike seems strong possibility in view of the demand-supply situation.

ROADMAKING BOOM RIDES ON RAILS — P. 36
Road rails are being used extensively in the country's highway programs. Rails provide a form for setting concrete. They offer tracks on which construction equipment can run. Demand for road rails is over one million ft per year. Replacement rate is high.

STEEL: RECORD YEAR FOR RECORDS — P. 37
Majority of steel producers report all-time record second quarters and half-years in earnings, production and bookings. Indications are that 1955 will be steel's year for breaking records. Key seen as general, all-round industrial demand—construction, shipbuilding, railroads as well as automotive.

GOVT. BIN PROGRAM SQUEEZES GALVANIZED — P. 43
The new Federal program for grain storage bins to hold 100 million bu will need at least 18,000 tons of galvanized sheet per month. With many producers out for the year on galvanized already—and new capacity not nearly enough—galvanized consumers will have to tighten their belts a few more notches.

FOURTH QUARTER DELIVERIES BIG POSER — P. 128
Back-to-the-wall steel consumers are now shaking their defense priority ratings at the mills in an effort to step up deliveries. While defense ratings have always been included in consumer orders, up until now they've only been of academic interest. Speed-up spotlight is on reinforcing bars in Cleveland destined for atomic energy plant and some munitions depot construction.

NEXT WEEK:

NEW POWDERED MATERIAL REDUCES BEARING WEAR
Can worn, corroded machine tool bearing surfaces be reconditioned while the machines run? One firm does it by adding micro-sized particles of a copper-lead mixture to the regular lubricant. This is standard treatment for all the firm's machine tools—old and new. It is also added to coolants for longer tool life.

WHAT'S THE FUTURE FOR FAST TAX WRITE-OFFS?
Washington statements show a growing feeling that fast tax amortization privileges have been granted on too broad a scale. Theory is the program should be confined to direct military production. Next week's story goes into this question, discussing the chances of a cutback, telling who would be hit.

These Jeffrey welded steel slatted pulleys keep gritty or sticky material from damaging belts. Wide crossbars give good belt traction . . . . rounded edges prevent gouging. Cone under-structure assures constant self-cleaning.

Welded steel slatted pulleys give conveyor belts "9 lives"

Conveyor (and bucket elevator) belts die fast when abrasive or sticky materials lodge between them and the pulleys. Jeffrey welded steel slatted pulleys eliminate these trouble-makers, greatly extending belt life.

These pulleys will not build up substances that cause belt fabric damage and misalignment as when solid face pulleys are used. Their cone design discharges run-offs from the belt before damage is done. Not only are *belts saved*, but the slatted pulley outlasts the solid face pulley as well!

Because of this self-cleaning action, Jeffrey welded steel slatted pulleys are real money-savers in such industries as stone, sand and gravel, clay, chemical, foundry, iron, slag, metal and coal mining, and wood.

Wide range of sizes

They are available in standard sizes of 12" to 42" diameter and 8" to 42" face width (other size combinations on request). Write today for a quotation on your needs.

Merchandise Sales Division

THE JEFFREY MANUFACTURING CO.

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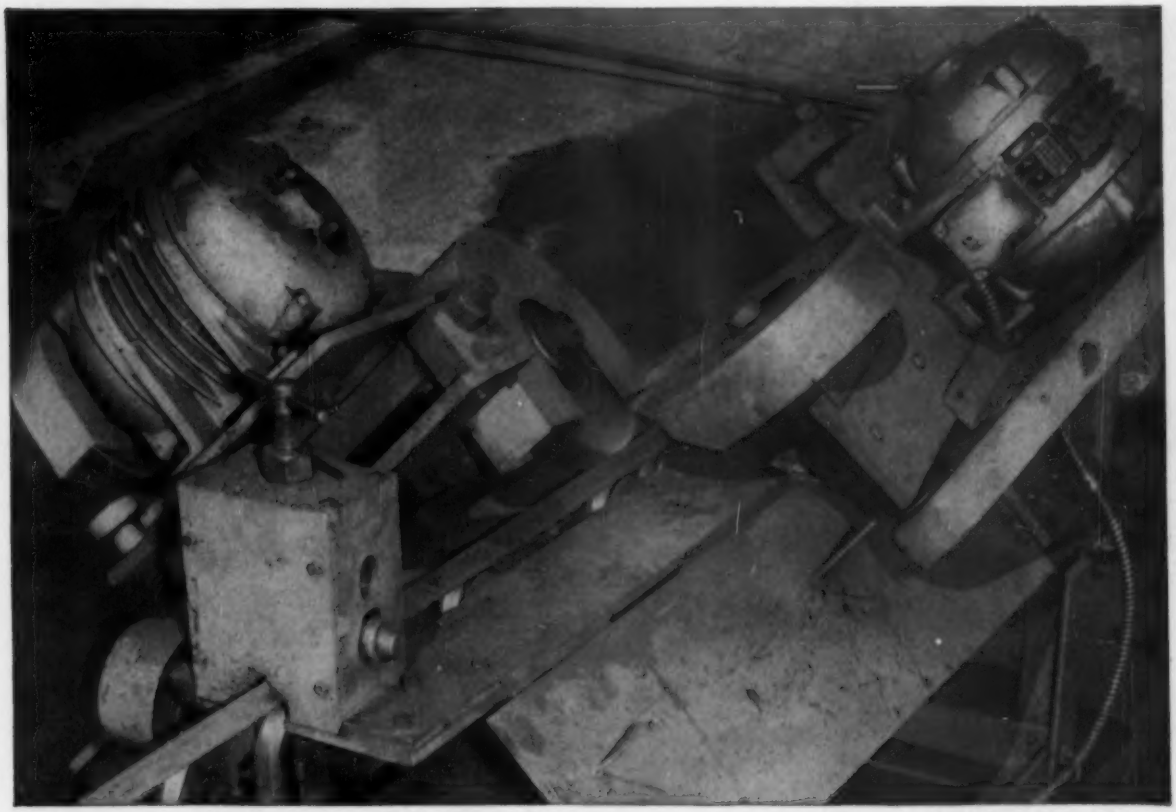
IF IT'S MINED, PROCESSED OR MOVED . . . IT'S A JOB FOR JEFFREY!



FAST PASS STRIPS SCALE

to save money on material!

A cost-reducing idea an OBA can duplicate in your plant

This manufacturer takes advantage of a price differential by buying a grade of angle iron that still has mill scale on it.

The Problem: How to remove this hard scale and still save money over purchasing a more costly grade of steel that has been pickled.

Here's what they do: The angle iron bars are fed through a simple brushing machine against two Osborn Master® Wheel power brushes. In one pass, these Osborn Brushes effectively remove the hard, flint-like scale . . . at a rate of 150 feet a minute.

The strips come clean, ready for production.

You benefit many ways by having an **O**sborn **B**rushing **A**nalysis made of your cleaning and finishing operations. You can improve the quality of your product, automate your methods and cut manufacturing costs. Write us about an **OBA.** *The Osborn Manufacturing Company, Dept. F-35, 5401 Hamilton Ave., Cleveland 14, Ohio.*

Osborn Brushes

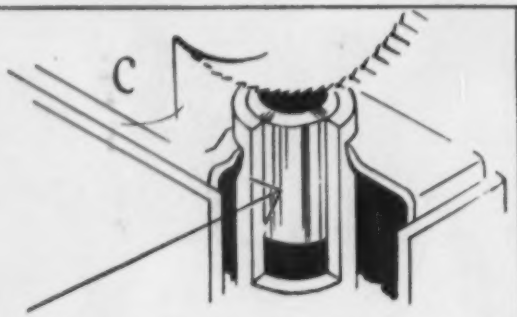
OSBORN

BRUSHING METHODS • POWER, PAINT AND MAINTENANCE BRUSHES
BRUSHING MACHINES • FOUNDRY MOLDING MACHINES

HOW ARMCO 17-7 PH STAINLESS STEEL

keeps this lighter in shape

A tiny hardened Armco 17-7 PH Stainless Steel bushing is the key to dependability and long service life of a well-known lighter.



WHAT THE STAINLESS BUSHING DOES

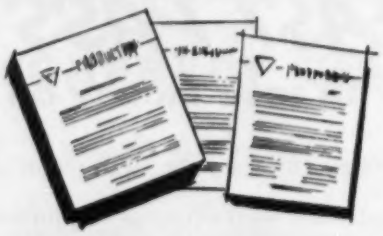
This collar in the top of the tube keeps the flint in alignment and prevents jamming. The collar must be perfectly formed and very hard. That's why it's made of Armco 17-7 PH Stainless Steel, precipitation hardened.

NO "FLOPOVER" FLINTS

In an ordinary flint tube, repeated pressure of the spark wheel against the flint causes the end of the tube to expand. This permits the flint to "flop over," making the lighter useless.

WHAT THIS STEEL OFFERS YOU

Consider the advantages of Armco 17-7 PH Stainless Steel for your products. It can be drawn and formed in the annealed condition to close tolerances. Then, it can be hardened at low temperatures to tensile strengths of around 200,000 psi. It is "transformed" by holding at 1400 F for 1½ hours and cooling to 60 F or below. Hardening is completed by heating to 950-1050 F, holding for ½ to 1½ hours and cooling.



GET COMPLETE DATA

Armco 17-7 PH is produced in sheets, strip, plates, bars and wire. Besides, there is a single heat treatment precipitation-hardening stainless steel, Armco 17-4 PH, made in bars, wire and billets only. For complete information on these special Armco Stainless Steels, just fill out the coupon and mail it to us.

ARMCO

ARMCO STEEL CORPORATION
1585 CURTIS STREET, MIDDLETOWN, OHIO

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The Iron Age

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EPA NBP

Editorial:

Are You A Gloomy Gus?

◆ SOME BUSINESS PEOPLE have a dual personality when it comes to the business outlook. For publication they think things are fine. Privately they think we are headed for a big bust.

It is important what businessmen think in the privacy of their home or at their club—more important than what they say for public relations reasons. If industrialists have confidence in the future of the country, that means they will spend for expansion, for new products, for promotion, for advertising and, of course, for profit.

There are a lot of people who are sad because the good old days are not here. They are not coming back. There is a new crop of managers, consumers and children coming up who are going to do things the way they want them done. Unless some business policies, trends and products are pitched to them, it could mean less business —and less profits.

Right now there is a lot of talk about the credit situation. There is a lot of warning and viewing with alarm. In many cases the standards of opinion are those of the 1929 era. This is not 1929. People are thinking and acting differently. They are going to get out of life all they can right now. They are not going to wait.

This spirit of doing it now or buying it now has extended to many industrialists. Their business depends on what the man on the street does. If you cannot supply those kind of customers—and their customers—with what they want when they want it, someone else will.

On this credit picture there are a lot of experts "experting" who don't know much about either credit or installment buying. Installment buying is here to stay. People have been doing it since the turn of the century. There isn't anything new about it. All at once it gets in the limelight, and a lot of business people start worrying. But this worry is a psychological pattern of behavior based on depression recall.

Installment losses today are less than one-half a cent for each sales dollar. Repossessions are at low ebb. The argument runs that if something happens, millions of people will be stranded with an unpaid-for appliance, house or gadget, and things will go to pot in a wheelbarrow.

This certainly will happen if Gloomy Gus gets too many converts.

Tom Campbell

EDITOR

EVOLUTION of MULT-AU-MATIC PROGRESS

Since 1914 the Bullard Mult-Au-Matic has reflected engineering and design progress required to fulfill industry's needs — until today, the Type "L", is the optimum for machines of its type.

Here are some of its features...

CONTROL SYSTEM

Advanced design of electro-hydraulic controls provide a readily accessible and simple control system for both Set-Up and Automatic machine operation.

FEED MECHANISM

Completely new screw type feed works insures smooth constant rate of advance of tool slides through any desired part of a 16" stroke with 81 feed changes ranging from .0025 to .0625.

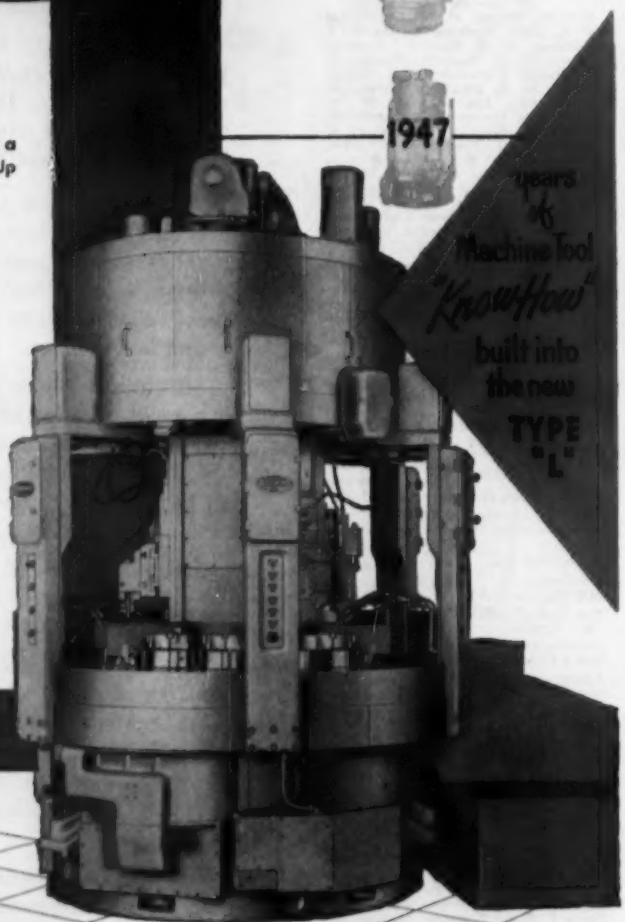
SELECTIVE SPINDLE SPEEDS

Range from 35 r.p.m. to 1,000 r.p.m. at each station providing the correct cutting speed to suit the specified operation.

CARRIER INDEX

The new indexing mechanism with improved carrier column bearing permits faster index of spindle carrier thereby reducing time between cuts. New design index mechanism registers and locks carrier, on successive indexes, to within ±.0005.

SEVENTY FIFTH BULLARD ANNIVERSARY



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THE MACHINE TOOL SHOW
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Available in three sizes
10" with 6, 8, 12 or 16 spindles, 14" and 18" with 6 or 8 spindles.

THE BULLARD COMPANY
BRIDGEPORT 2, CONNECTICUT

dear editor:

letters from readers

Representatives

Sir:

We are open for the representation of further reliable manufacturers and/or exporters in the steel and metal field.

We have been established here since 1938 and bank with the Barclays Bank D.C.O., Voortrekker Road, Parow, C. P., South Africa.

We would be pleased if you would make the fact known to your readers, that we are interested in receiving quotations, stating fullest details of items to be exported, including used boiler tubing in 1 to 4-in. diam in good condition, offgrade steel products, as well as other metal and steel products suitable for this market. *Kurt Leyser, Kurt Leyser Manufacturers' Representative, P. O. Box 2, Elsies River, C. P. South Africa.*

"100 Years"

Sir:

May I add to the many you have already received, the congratulations of the Oakite organization on your publication's 100th Anniversary.

It is more than a milestone in the long and successful history of THE IRON AGE . . . It is an event of high importance and significance to the whole metal working industry of which your publication has been an integral part and a contributing factor in its progress. And so our wish to you is that you will have many more years of success. *J. A. Carter, President, Oakite Products, Inc., New York.*

Vacuum Setup

Sir:

We are very much interested in the article published in THE IRON AGE issue of June 23 concerning the vacuum setup installation which is operating at the Carboloy Dept. of the General Electric Co.

We are interested in building such installations in France and should be obliged if you would let us know the name of the firm who designed and installed the equipment. *MECI (Materiel Electrique de Controle et Industriel), Paris.*

The company which installed this equipment is the Consolidated Vacuum Corp., Rochester 3, N. Y.—Ed.

Welded Art Work

Sir:

I was very much interested in the story on welded art work. I am wondering what the source of this story was and if there is any information available about the extent to which this art work is practiced. *C. G. Herbruck, Asst. to the Secretary, The Lincoln Electric Co., Cleveland.*

Further information may be obtained from the Sculpture Center, 167 E. 69th St., New York, N. Y.—Ed.

Magnetic Clutch

Sir:

While reading the June 23 issue, I came across an item in the Newsfront section entitled "Magnetic Clutch Eliminates Wear."

I would appreciate your sending me the name of the manufacturer of this device, and any other pertinent information you may have available. *J. J. Dombek, Tool Research Dept., International Harvester Co., Industrial Power Division, Melrose Park, Ill.*

Further information may be obtained from the Vickers Electric Div., Vickers Inc., 1815 Locust St., St. Louis 3, Mo.—Ed.

fatigue cracks

by William M. Coffey

Here's a Good 'Un

The thing that we secretly nurse to our bosom is the fact that so many fine, understanding readers of IRON AGE are on our side. The ones, we mean, who submit jokes that the editors won't print, who offer pictures of beautiful girls whom the editors allege won't add much to our 100 year history (all they believe in is metal), who send us fine letters which convince us how lousy we are, all of which are religiously forwarded to the publisher. Now, at this time, we want these understanding people to know that we prize them above all others. Thanks. Many thanks, for supporting our movement to get us relieved from this fatiging job. May we, however, offer a word of pleading. Please send us jokes like the one that follows. These are the kind that will do the trick. The editors will print them and—well, read it yourself.

Two six year old boys.

One says to t'other, "how many children are you going to have?"

T'other says to the one, "take it easy, old buddy, I can't even tie my shoe laces yet."

With great appreciation to Rod Nickum, who has read your ffj for 47 years.

Puzzlers

What is the area of a square when the diagonal is 2 in. longer than its sides? Well, now . . . it seems that the majority answer is something around 23—23.31370. However, those who said 4.83 (forgot to square it) we'll still put in the winning column, Winners: James F. Carlin, Jr., Chilton Co.; C. E. Rick, Du Pont; Wilbur Handy, The Fellows Gear Shaper Co.; Wallace A. Sawdy, MacInnes Steel Sales Co.; N. A. Osborne, Armco Steel Corp.; Everybody at General Steel Castings; William E. Smith, Sylvania, Ohio; 2nd Lt. Paul M. Koppel, New York Chemical Procurement District; John L. Plum, Plum & Little; Bob Jewell, R. C. Mahon Co.; ole Joe Brugman; Austin H. Phelps, U. S. Engineers; and a word to old friend I. M. Darcey — too much heat?

New Puzzler

X and Y are both three digit whole numbers. The cube of one is a million times the square root of the other. What are the numbers? Many thanks to Wallace Sawdy. MacInnes Steel Sales Co.

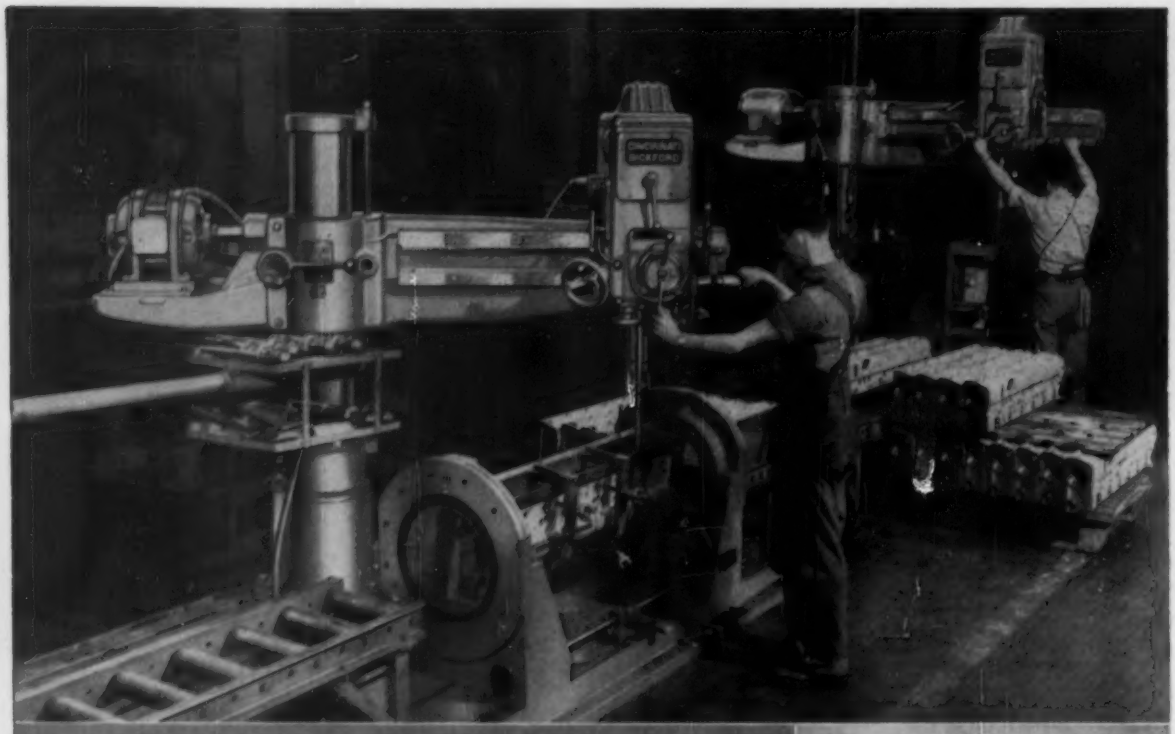
Here's Another Good 'Un

Don't ask us what she's doing . . . but she's wearing a lot of metal. Comes from The Pall Filtration Companies. She's called Miss Poro.

Summer Bonus Puzzler

They say the best thing you can do about the heat is ignore it. You have our permission to ignore this puzzler, too, but we had to fill some space. And it's a pretty good variation on the old ladder problem.

A house painter has a ladder 12 ft long. He is painting a vertical wall. At the base of the wall is a box with a 3 ft square cross section area. With the ladder touching the edge of the box and its foot resting on the ground, what is the highest point at which the ladder will touch the wall?



3 years of operation with NO MAJOR MAINTENANCE . . .

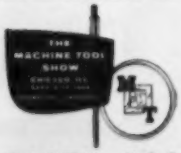
Photos courtesy Caterpillar Tractor Co., Peoria, Illinois.

Camshaft Housings for new Caterpillar DW21 Wheel-type Tractor illustrated in insert picture, showing casting before and after drilling operations.

The performance of Cincinnati Bickford Super Service Radial Drills at Caterpillar Tractor Co. has been outstanding, steady and trouble free.

On this job, including drilling, tapping and reaming, 116 holes are produced, 14 are reamed within .0005″ tolerance. Caterpillar Tractor Co. also states Cincinnati Bickford Super Service Radial Drills have contributed to the advancement of their product.

Write for Catalog R-21-C.



BOOTH 901

80 YEARS OF SERVICE

CINCINNATI BICKFORD

SUPER SERVICE

RADIAL AND UPRIGHT DRILLING MACHINES

THE CINCINNATI BICKFORD TOOL CO.

Cincinnati 9, Ohio, U.S.A.

dates to remember

AUGUST

AMERICAN SOCIETY OF TRAINING DIRECTORS — 2nd Annual Institute, August 7-20, Eagle Waters Resort, Eagle River, Wisconsin.

DENVER RESEARCH INSTITUTE—4th annual symposium on Industrial Applications of X-Ray Analyses, August 11-12, University of Denver, Denver, Colo.

NATIONAL ASSOCIATION OF FURNITURE MANUFACTURERS — August 28-September 1, Conrad Hilton Hotel, Chicago. Showing on new products and ideas.

EXPOSITIONS

MACHINE TOOL SHOW—Presented by National Machine Tool Builders' Assn., International Amphitheatre, Chicago, September 6-17 inclusive. This is the first industry-wide showing since 1947 of the advance in machine tools.

WESTERN ELECTRONIC SHOW AND CONVENTION — August 24-26, Civic Auditorium, San Francisco, California.

GENERAL MOTORS — Powerama, August 31-September 25, South Lake Shore Drive, adjacent to Soldiers Field, Chicago.

NATIONAL INDUSTRIAL CONFERENCE BOARD AND STANFORD RESEARCH INSTITUTE—National symposium on current "Electronics and Automation Production," August 22-23, San Francisco, California.

SEPTEMBER

AMERICAN MACHINE TOOL DISTRIBUTORS ASSN.—Annual meeting September 5-6, The Blackstone, Chicago. Association headquarters are at 1900 Arch St., Philadelphia.

INSTRUMENT SOCIETY OF AMERICA—Annual meeting, September 12-16, Shrine Auditorium, Los Angeles. Society headquarters are at 1319 Allegheny Ave., Pittsburgh.

INTERNATIONAL BRIQUETTING ASSN.—Annual conference, September 1-3, Stanley Hotel, Estes Park, Colo. Association headquarters are at the University of Wyoming, Laramie.

ILLUMINATING ENGINEERING SOCIETY—National Technical conference, September 12-16, Statler Hotel, Cleveland.

NATIONAL ELECTRIC ASSN.—Annual fall conference, September 15-16, Sheraton Hotel, Chicago, Ill.

SOCIETY OF INDUSTRIAL PACKAGING & MATERIALS HANDLING ENGINEERS—Annual meeting, September 19-22, Kings Armory, New York. Society headquarters are at 111 W. Jackson Blvd., Chicago.

AMERICAN BANKERS ASSOCIATION—81st annual convention, September 25-28, Conrad Hilton Hotel, Chicago.

useful tool in your plant?

There are "SCOTCH" Brand Pressure-Sensitive Tapes to hold, seal, bind, mask, bond, bundle, protect, reinforce —in fact, to do hundreds of jobs in thousands of different ways. And wherever you use them, you'll profit through lowered costs, faster production, or improved products. What's more, these "tape tools" are even more valuable when you use automatic or semi-automatic tape applying equipment. We'll be glad to show you how such equipment can turn many a manual operation into a production-line step literally overnight. No cost or obligation, of course. Just check the coupon and drop it in the mail.

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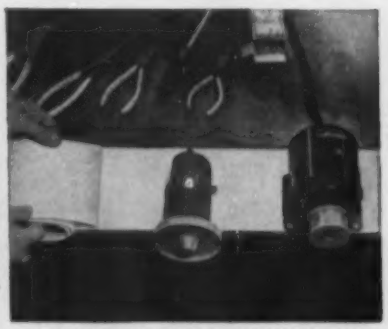

4. DOUBLE-COATED TAPES give you *two* sides of the strongest adhesive on any pressure-sensitive tapes. Above, Tape No. 400 holds repaired motors and generators on testing bench; eliminates need for time-consuming drilling, bolting, and unbolting.

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86 inches wide, in fact—by 138 inches long...*all* belt! Here's why: to generate taper of the required precision on huge aluminum aircraft "skins," conventional milling methods were far too slow and costly. So CARBORUNDUM abrasive engineers, in collaboration with the Air Force, Bell Aircraft Corporation, and the Hill-Acme machine people, designed and produced this special belt, in proper gradings to meet the rigid specifications of surface finish and dimensional accuracy.

● If *you* are stymied by an unusual grinding problem, turn to the source with the greatest experience and application "know-how" in the abrasive field today! Call in your CARBORUNDUM Distributor or salesman, or write The Carborundum Company, Niagara Falls, New York. In Canada: Canadian Carborundum Company, Ltd., Niagara Falls, Ont.

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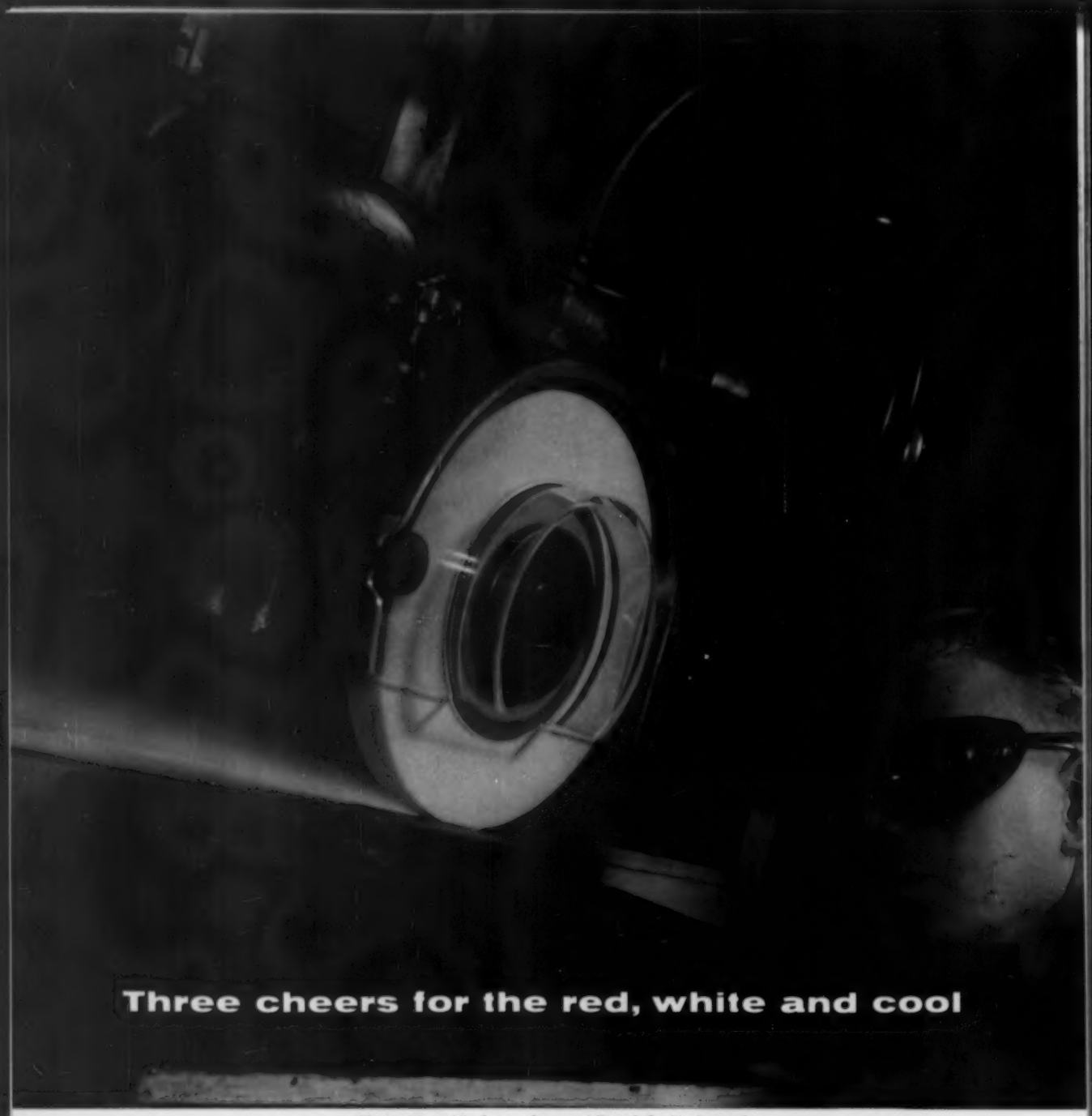

The "see-through" safety guard was specially made for this photo only.

Distinctive RED blotter on a new WHITE wheel is the sign of COOL tool grinding worth cheering about! And that's not all...V40 Bond Tool Room Wheels by CARBORUNDUM cut faster, last longer and permit heavier infeeds without burning the stock or overheating the tool, even on die steels and hi-vanadium types. And the outstanding form-holding ability of V40 Bond Wheels eliminates costly stops for wheel dressing halfway through a job. Try one in your shop today. There's a type for every tool room operation...easily identified by the V40 on the bright red blotter. Your CARBORUNDUM Distributor or salesman will arrange a free demonstration. For Bulletin A-1310, write The Carborundum Company, Niagara Falls, New York. In Canada: Canadian Carborundum Company, Ltd., Niagara Falls, Ontario.

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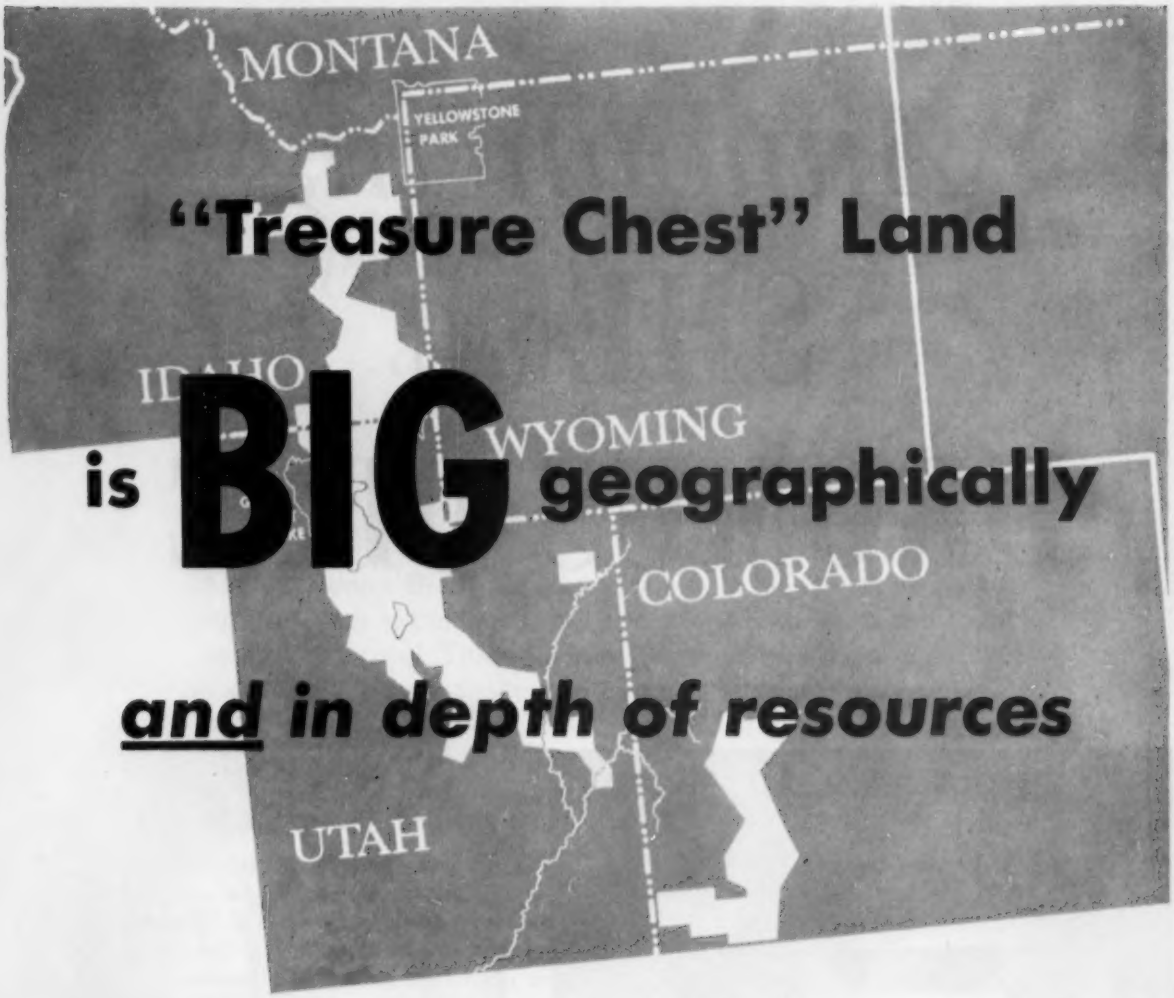

"Treasure Chest" Land is BIG geographically

and in depth of resources

This area is *big*. "Treasure Chest" land is rich in untapped resources, too. For example, in this area are 60% of the nation's phosphate reserves, huge reserves of coal, oil and gas—and mountains containing 214 different minerals. Knowing this, such firms as U. S. Steel, Kennecott Copper, Monsanto Chemical, U. S. Vanadium, Vitro Uranium, Westvaco and scores of others have invested millions in facilities to extract and convert this region's raw materials into products for western, national and foreign markets. The vast Utah, Idaho, Colorado and Wyoming area—23,000 square miles of it—served by Utah Power & Light Company invites and merits the careful study of any industry seeking unlimited material sources as a base for expanded operations.

Ask for copy of "A Treasure Chest in the Growing West."

Detailed information is presented in this Area Resource Brochure. Write, wire or telephone for a copy. Inquiries held in strict confidence. Address: W. A. Huckins, Manager, Business Development Department, Dept. 6, Utah Power & Light Co., Salt Lake City 10, Utah.

- **Every major basic raw chemical.**
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Announcing
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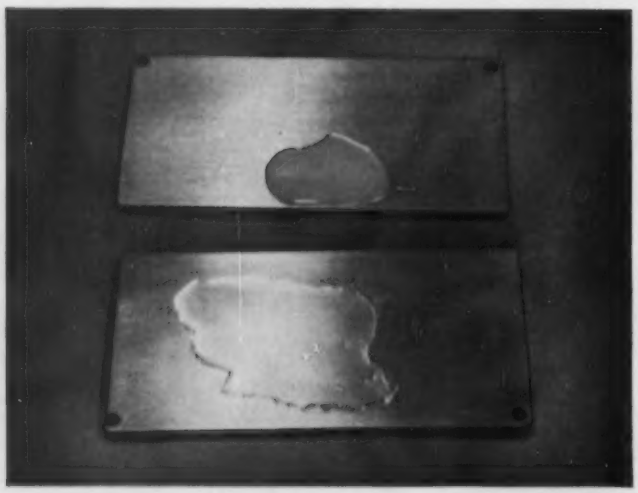

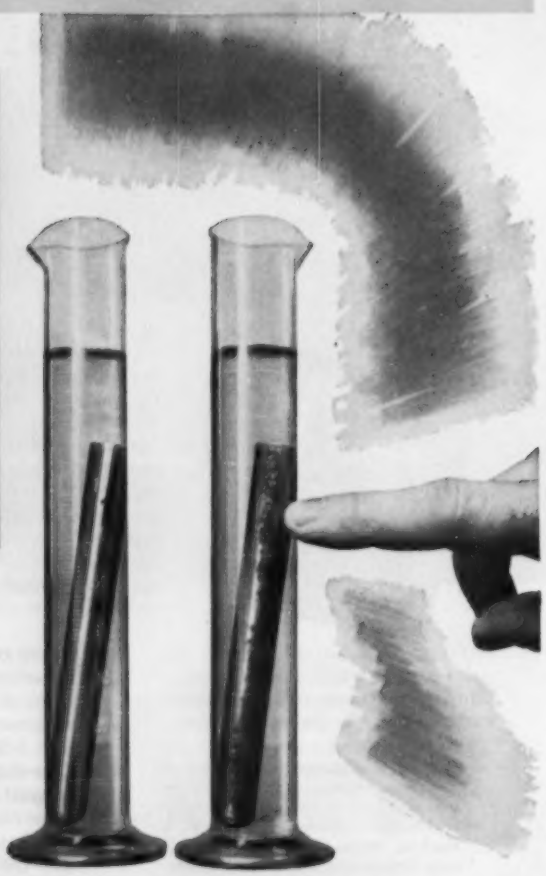

Above: Cooling action of a cutting fluid is directly related to its wetting ability. Conventional soluble oil emulsion (background) "balls" up. Equal amount of Shell Dromus Oil E spreads out thinly . . . wets far greater area.

Right: Plain carbon steel, if left in water at room temperature for about two hours, will rust as shown. Sample on left was in a 1-30 solution of Shell Dromus Oil E and water *for six months without rusting.*

SHELL DROMUS OIL E

NEW CUTTING OIL

permits higher speeds and faster feeds than ever maintained before

Shell Dromus Oil E, a new solution-type fluid, wets all metal surfaces with extreme rapidity and keeps both work and tools exceptionally cool. These qualities permit an increase of machine speeds and/or feeds far beyond anything allowable with conventional soluble oils.

IT'S MUCH EASIER ON TOOLS

There's much more life in any cutter or abrasive wheel when protected by this new oil. *It stays put* between tool and work. (At a 1-30 dilution, average tool life increase in extended field tests was about 50%.)

IT FIGHTS RUST

Shell Dromus Oil E is readily soluble in hot, cold, soft or hard water, and stable in any concentration. Even at low concentrations, it gives excellent rust protection to all ferrous metals, *including cast iron.*

IT KEEPS WORK COOL

Even at stepped-up production rates, you'll find less heating and better finish wherever this new oil is used.

IT SETTLES OUT FAST

Chips and wheel particles settle out immediately . . . the recirculated fluid is clean and free from contaminating particles. It is *not* sticky or greasy . . . leaves no deposits on machines or work.

IT'S GREAT FOR GRINDING

Grinding wheels remain clean, *even when material retains a film of cutting oil from a previous operation.* Even cast iron can be ground cleanly when Shell Dromus Oil E is used to cool the work.

If all this reads "too good to be true," we suggest that you try Shell Dromus Oil E *on any problem operation you have.* It *is* that good!

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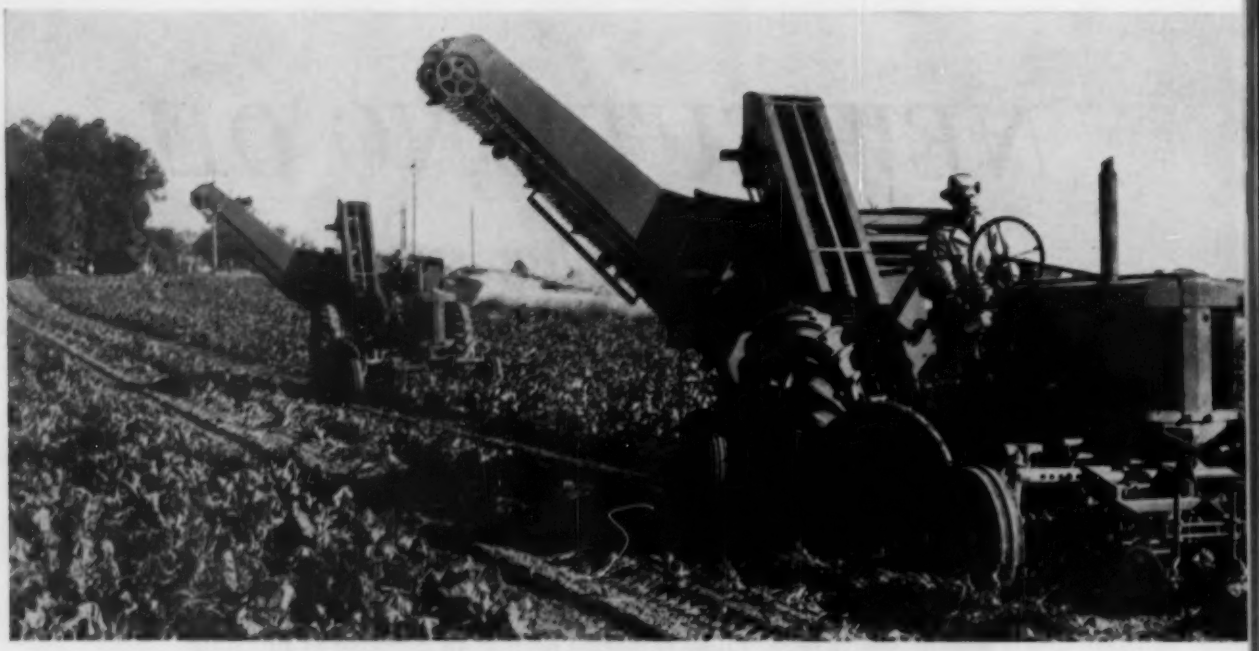
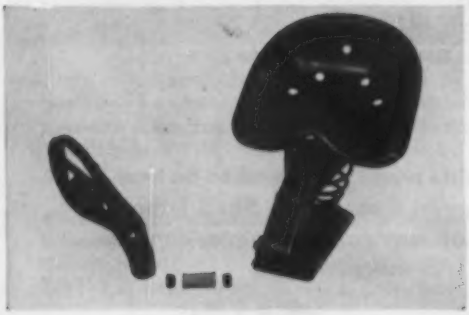
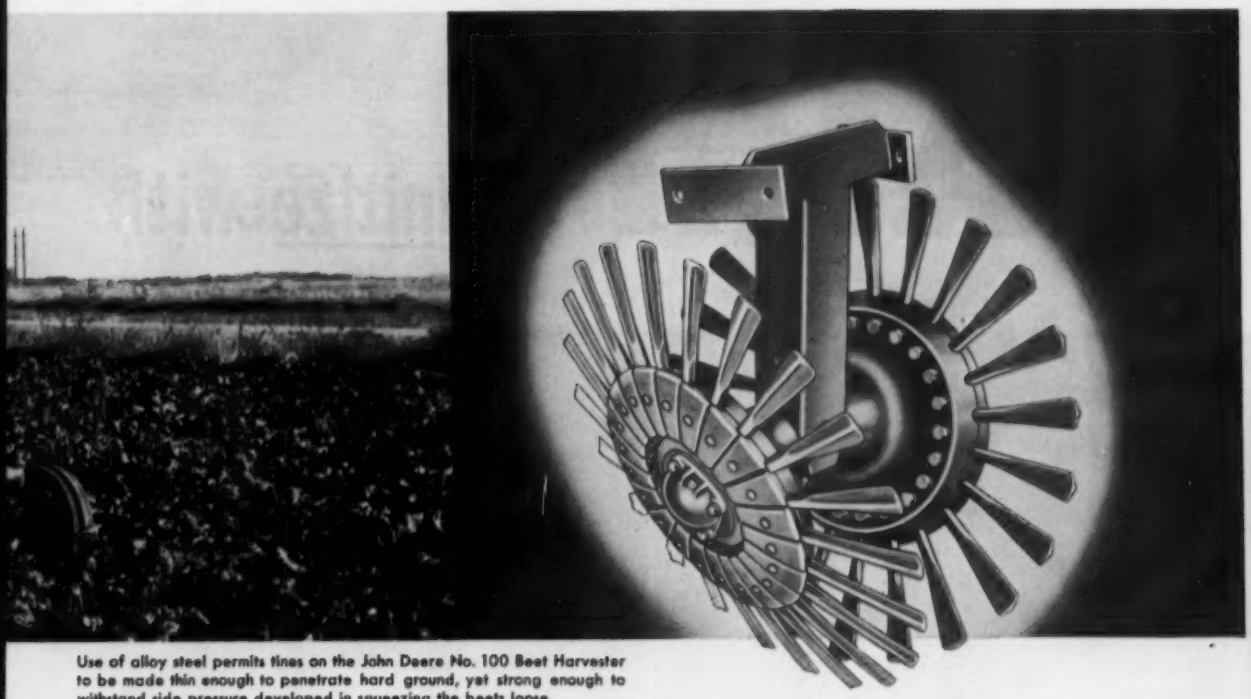


HOW ALLOY STEEL HELPS JOHN DEERE BUILD A STRONGER BEET HARVESTER



STRENGTH TO WITHSTAND SHOCK AND TWISTING is provided by Republic ELECTRUNITE Mechanical Tubing in this pilot tube which acts as a bearing for a tractor seat assembly. The tube is flared on each end and rubber grommets inserted. In this application, the tube must withstand constant shock and twisting caused by the uneven surface of furrows and plowed ground. ELECTRUNITE also provides uniform wall thickness, uniform concentricity, and is available with close I.D. and O.D. tolerances. Available in carbon and stainless analyses from Republic's Steel and Tubes Division.

HIGH STRENGTH and fine surface, toughness, hardenability, close tolerance, accuracy of section are cost-cutting qualities you can take full advantage of in steel parts production. Cold Drawn Alloy Bars supplied by Republic's Union Drawn Steel Division give you all six of these properties — plus UNIFORM MACHINABILITY. That's why so many manufacturers have come to Republic with their machining problems. Republic metallurgists and machining experts are always ready to help uncover the answers to tough cost and production problems. Write for information, there's no obligation.



Use of alloy steel permits tines on the John Deere No. 100 Beet Harvester to be made thin enough to penetrate hard ground, yet strong enough to withstand side pressure developed in squeezing the beets loose.

Field experience during the 1953 sugar beet harvest indicated that strengthening of the beet digger tines on the John Deere No. 100 Beet Harvester was necessary to prevent bending.

A change in the shape of the tine or tooth accomplished part of the strength increase. Deere's Engineering Department also felt that by increasing the surface hardness of the tooth, its performance would be improved.

But it was not possible to go to a higher hardness on the carbon steel previously used because the tines became so brittle that they would break under stress. So Deere switched to alloy steel, of which Republic is a supplier.

By taking full advantage of the superior strength and hardenability of alloy steel, bending and abrasion problems have been eliminated. The tines are 24% stronger than those previously made from carbon steel, and without loss in toughness or wearing qualities. Field experience in the 1954 harvest indicates that the alloy steel tine is completely satisfactory and has a much better service life than the previous types.

Alloy steels provide an outstanding combination of qualities essential to designing smaller sections to carry heavier loads with no sacrifice of strength or safety. They resist fatigue, shock and stress. They respond uniformly to heat treatment, producing hard, wear-resistant surfaces around tough cores.

Perhaps you have a problem involving one or more of these factors. Republic—world's largest producer of alloy steels—offers you metallurgical and engineering assistance to help you get the most from alloy steels at the lowest possible cost. Mail the coupon for complete information.

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K-4817

AIM to unitize with

Unitizing of random length hardwood flooring permits quick and easy handling for storage. Idea 531

Steel landing mats for use by the armed forces are unitized for ease in handling. Idea 537

Automotive axles unitized for safe shipment and efficient handling with Acme Steel strapping. Idea 533

Unitized lumber is easily handled by fork truck from outdoor stocks to carrier. Idea 534

Self-palletized brick pack speeds up deliveries over former manual brick-by-brick loading. Idea 535

Acme Steel Strapping ideas . . . and save handling costs

Shipping many units strapped as one cuts loading and handling time to a minimum. Idea S36

Aluminum bar stock is self-palletized for easy handling in this unitizing idea. Idea S32

Unitizing—the art of preparing many packages or products into a single unit for handling—is proving to hundreds of manufacturers that shipping and handling costs can be cut—movements of materials speeded up. It's all in the application ideas brought about by the use of Acme Steel strapping and strapping tools . . . and the intelligence with which these ideas are originated and developed by your *Acme Idea Man. It's important to know, too, that unitizing isn't restricted to uniform squared-off packages; irregular product shapes and sizes can be unitized.

Talk to your *Acme Idea Man. He'll give you a shrewd analysis of shipping problems. You can reach him by calling the nearest Acme Steel office . . . or by using the coupon.

Remember—for you, the *idea* is the payoff.

ask your *Acme Idea Man to help solve your problems

ACME STEEL PRODUCTS DIVISION
ACME STEEL COMPANY
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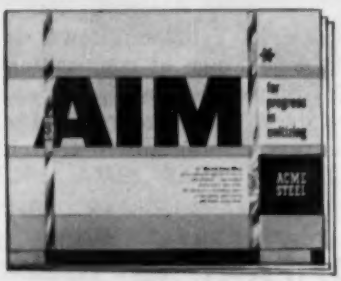
ACME STEEL



Get this new UNITIZING BOOK showing industrial unitizing ideas made possible by the use of Acme Steel Strapping. Fill out coupon on right.

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Please send me further information on Acme Steel's Safe, Lower-Cost Shipping Methods. I am interested in ☐ Steel Strapping; ☐ Wire Stitching; ☐ having an Acme Idea Man call on me.

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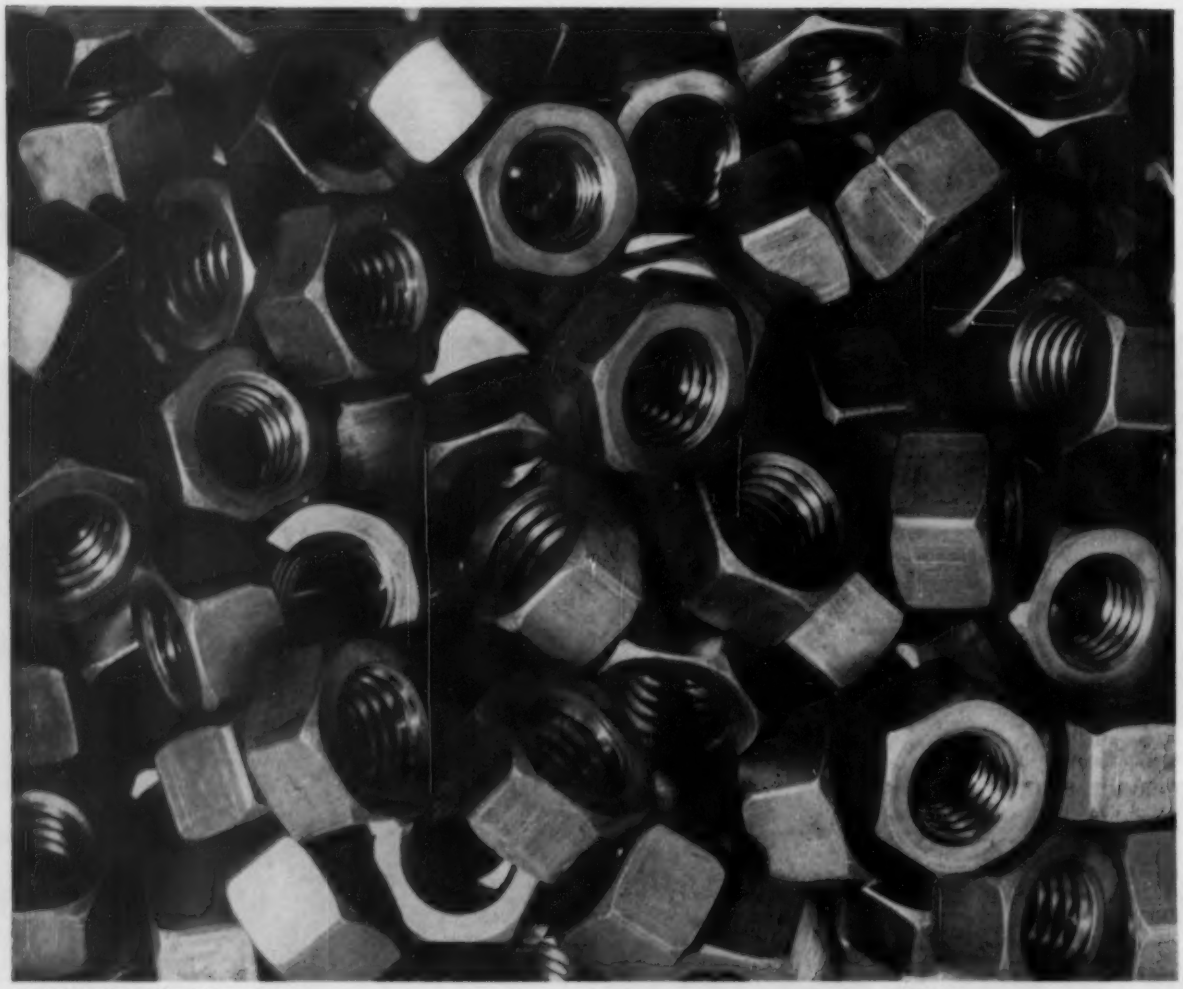

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Youngstown Scrapless Quality Nut Wire. The wire with the accurate sizing. The right composition. The wire that measures up to chemical and metallurgical checks for analysis. Micro-examinations, too.

Scrapless Quality Nut Wire with these qualities feeds smoothly through your machines. There is less downtime. Fewer rejects. And severe die wear is lessened.

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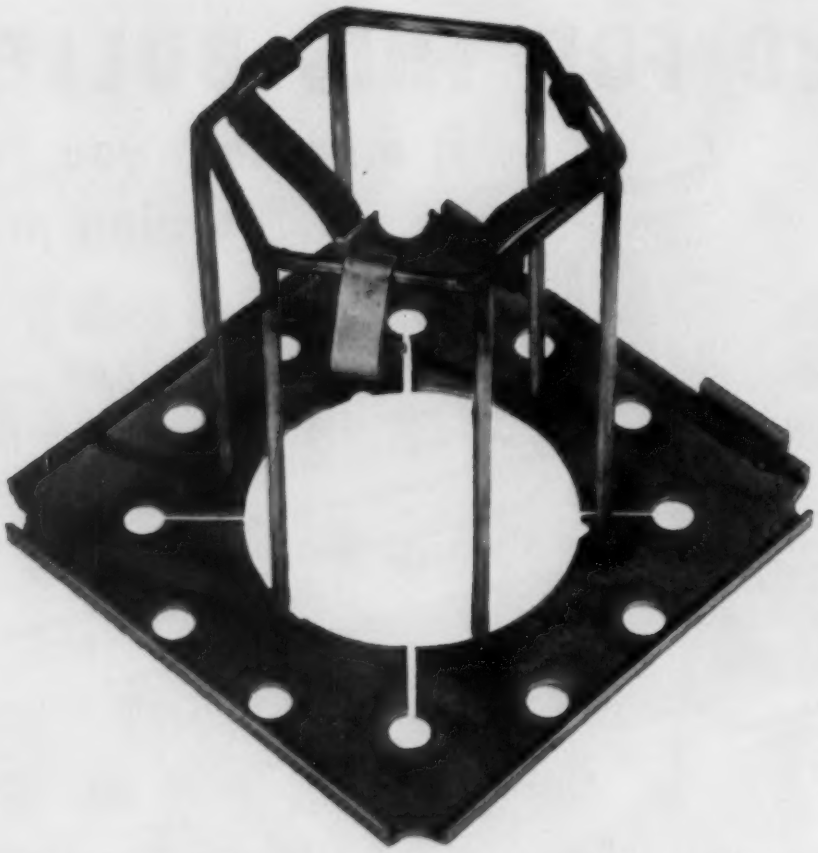

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of Heating and Quenching

This tray, made of a HAYNES high-temperature alloy, has been subjected to continual heating and cooling for 18 months . . . and it is still in good shape.

In the heat-treating operation, trays and rings are heated to 1550 deg. F for a half hour and then given a rapid oil quench. This repeated exposure to high temperatures and thermal shock caused other trays to twist out of shape in a few days.

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uses Cincinnati Shears...

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Photos courtesy—Morrison-Drabner Steel Co.

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WHAT—*HANDLES LIKE CARBON STEEL?*

That's right. 3 times stronger than carbon steel, Lukens "T-1" steel can be welded without preheating or special joint design.

Although Lukens "T-1" steel is a tough, high strength, heat treated steel, equipment builders will find that the techniques of working with this new steel are no different than with carbon steel. Recognizing that higher strength steels require higher pressures to form, proper design procedures will permit this low carbon, quenched and tempered alloy plate steel to be fabricated not only in the shop but also in the field. Those items of equipment which may not have to be stress relieved for dimensional stability or other special reasons can be fabricated of Lukens "T-1" steel to take advantage of its tough "as-welded" characteristics.

In addition to easy fabrication, Lukens "T-1" steel has other benefits of equal value to equipment builders. Three times stronger than carbon steel, this new steel has lighter weight and reduced thickness in comparison to heavier, thicker plates of carbon steel, thereby reducing material, fabrication and shipping costs. Lukens "T-1" steel's excellent resistance to the combination of wear and impact abuse lowers maintenance and replacement costs, lengthens equipment life. Lukens' range of steel plate sizes—including the widest and heaviest plates available anywhere—makes possible additional savings for builders through the use of wider plates that require fewer welded seams.

A new addition to Lukens' complete line of carbon, alloy and clad steels, this new steel's unusual combination of properties suit it especially to applications in pressure vessels, bridges, shipbuilding, construction machinery and general industrial equipment. On problems of design, material selection, application and fabrication techniques, Lukens offers full technical assistance. If you would like further information on Lukens "T-1" steel, write for Bulletin 765. Address: Manager, Marketing Service, 772 Lukens Building, Lukens Steel Company, Coatesville, Pa.

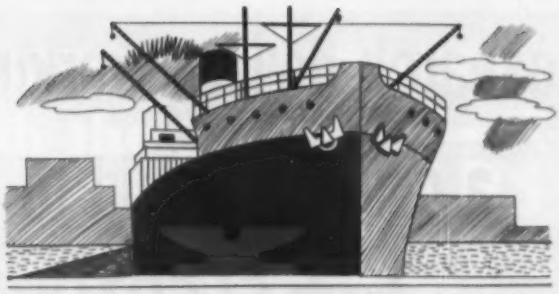
LUKENS

"T-1" STEEL

THE NEWEST IN A COMPLETE LINE OF ALLOY STEELS

LUKENS STEEL COMPANY, COATESVILLE, PENNSYLVANIA

you can't show a profit while the cargo's in the boat



Brownhoist equipment speeds material handling in ports all over the world

There's no profit in a shipment of bulk cargo until you get it out of the boat and put it to work for you. The quicker and cheaper you can do this, the bigger your profit will be. BROWNHOIST builds a variety of special equipment for handling bulk materials in large quantities rapidly and efficiently. The 15 gross ton boat unloader you see here, for example, can unload 1200 tons of ore an hour. It has a reach of 70 feet from the face of the dock on either side. The unloader is equipped with adjustable voltage control which gives extremely smooth operation and maximum production. BROWNHOIST also builds traveling bridge cranes, fast plants, storage bridges, car dumpers, locomotive cranes and clamshell buckets. Each machine is specifically engineered to do the job it is designed for as quickly and as economically as possible. For information about BROWNHOIST equipment to meet your requirements, consult your nearest BROWNHOIST representative or write us today.

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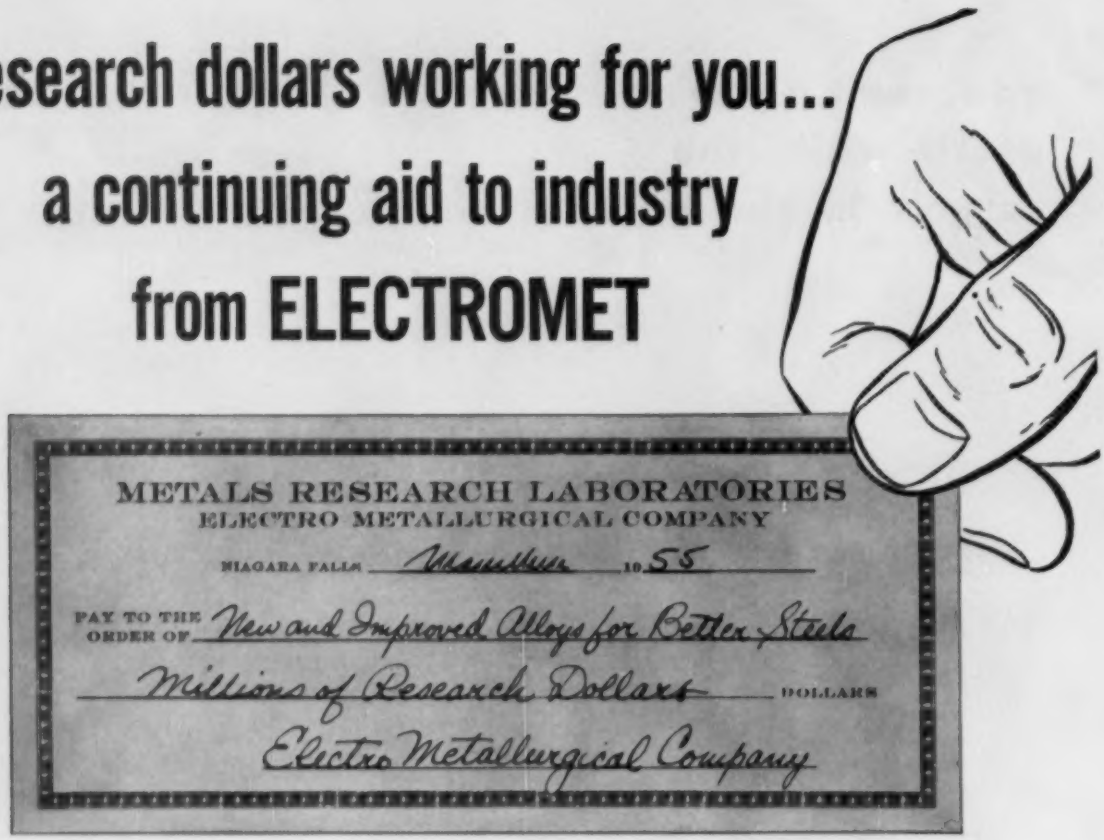

ELECTROMET's *research laboratories spend millions of dollars to develop new and improved alloys for better steels—and you receive the benefits.*

More than 300 skilled research scientists, engineers, and technicians work in ELECTROMET's Metals Research Laboratories on the solution of metallurgical problems. They develop new and improved ferro-alloys and metals, better ways of using them, and new and improved alloy steels and irons.

ELECTROMET conducts this continuing research program as a bonus for you, to provide high-quality ferro-alloys and valuable technical service.

You can profit from this continuing research program. For help on your problems in the use of ferro-alloys or the metallurgy of alloy steels or irons, please contact the nearest ELECTROMET office listed below.

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FULL-TIME, AUTOMATIC ARC CONTROL

with the NEW VICKERS Controlarc MAGNETIC AMPLIFIER-RECTIFIER DC Welder

- Easy, clean arc strikes
- Hot starts, immediate penetration
- No arc "pop outs"
- No current drop-off during pass
- Uniform fusion, steady rate of metal deposit

200 / 300 / 400 in ampere models

Patented Vickers Magnetic Amplifier...

CONTROLARC automatic control is made possible by the patented Vickers Self-Saturating Magnetic Amplifier with exclusive voltage-sensing, feed-back control circuits. Constantly analyzing welding voltage and automatically adjusting welding current to arc changes. Vickers Magnetic Amplifier maintains ideal arc characteristics, through the entire welding range, under all welding conditions.

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Separate, complete control of both voltage and current makes it possible to set up any volt-ampere combination within the output range of the particular Controlarc model being used . . . from minimum voltage at minimum current to maximum voltage at maximum current. Only Vickers Controlarc offers complete remote control of voltage and current through the entire welding range.

Full Range Voltage Control...

. . . separate from current control, permits choosing the exact arc characteristic for every job and welding condition. Voltage control is full range and stepless, with no limited "average" settings or blind spots. The weldor can select the arc characteristic for a basic welding position and pinpoint the setting for particular conditions.

Downdraft Cooling
No "vacuum cleaner" floor dust pickup.

Rectifiers
Conservatively rated for long life. Special finish protects from corrosive atmospheres.

Rust Protected
Interior surfaces zinc chromated.

Sealed-in Lubrication of Fan Motor Bearings

Duct-Cooled Transformer
Air ducts in windings for high-efficiency cooling.

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Low center of gravity.

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Portable mounting available.

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VICKERS ELECTRIC DIVISION

VICKERS Inc. A unit of Sperry Rand Corporation

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Here Is Extra Motor Value

Double-shielded bearing
Large grease reservoirs
Bolted-on bearing cap
Labyrinth seals

This Allis-Chalmers Bearing Design Gives More for Your Motor Dollar

The bearing cap is held tightly in place against the inner face of the bearing enclosure. This cap, with its close running clearances, keeps grease from the interior of the motor . . . retains an ample supply within the bearing enclosure.

At the outer side of the bearing, double labyrinth seals keep grease in, also keep dirt out. What's more, large grease reservoirs act as additional dirt traps.

You can lubricate these bearings without dismantling motor. Pipe-tapped holes in the bearing housings at two points provide means for inserting new grease, flushing out old grease and of relieving pressure during re-greasing.

Look for the extra bolts on the end housing . . . the sign of greater value. Ask your Allis-Chalmers representative or Authorized Distributor to show you a cutaway section of this maintenance-cutting design. Or write Allis-Chalmers, Milwaukee 1, Wisconsin, for Bulletin 51B7225.

A-4616

ALLIS-CHALMERS

The Iron Age Newsfront

Modernization: Pedal to the Floor

The drive to modernize automobile plants and automotive processing methods has gained steam since the settlement with UAW (CIO). In the opinion of many automotive tooling experts the race to produce better products at lower cost has only begun.

Titanium's Corrosion Resistance Used

One little known benefit of titanium's corrosion resistance is in use of fine titanium fabric for reinforcing extremely weakened abdominal walls in post-operative care, especially in hernia cases. Although an extreme measure, patient can become ambulatory rather than bedridden, though the abdomen has insufficient strength for correct support.

Power: Surge In Generating Capacity

Continued expansion of electrical generating capacity in the U. S. will require more and more electrical grades of steel. Although annual increase of electric generating capacity has been expected to hit about 10 pct for the next few years, this year it will run 15 to 18 pct.

One Cause: U. S. Is Appliance Happy

One cause of the need for more expansion of electrical facilities, is the tremendous upsweep in use of home electric appliances. Take air conditioners. They require over-capacity in utility distribution transformers to carry seasonal peak loads. Other home appliances multiply the problem.

What This Means to Steel

U. S. capacity for electrical grades of steel is short and in for a big expansion in the next few years. Another major producer of electrical sheet is expected to enter the market in the near future.

Stud Driver: Faster, Safer, Larger

One manufacturer is taking the bugs out of a new cartridge powered stud driver. It will handle larger diameter steel studs, have more safety features, permit rapid interchange of stud sizes at the firing head.

Heavy Presses: Program Drags Along

The Air Force heavy press program, held up and changed many times, continues to drag. Current program is further impeded by bickering between Air Force and aircraft manufacturers over final press design characteristics. Decisions covering a single design feature have in some cases taken over a year to reach.

New Plating Equipment Carries Bigger Load

Suppliers of plating equipment are delivering the kinds of machines platers have been demanding to give them greater output, lower unit cost and more flexibility. One Detroit plating shop, using a modern barrel plating machine, turns out 16,000 to 20,000 lb of small diversified parts per hour. Each barrel follows its own predetermined cycle.

Test Rugged Field Type Computer

A rugged, field-type computer weighing about 1500 lb and having a low power consumption of about 5 kilowatts is being tested by the Army Corps of Engineers. The unit, designed to withstand dust and extreme changes in temperature and humidity, can be quickly loaded in mobile laboratory.

Spray Plastisols Electrostatically

Vinyl plastisols are being successfully spray coated, electrostatically, on wire and wire products such as wire baskets, dish drainer racks. The method is faster than dip coating and eliminates wastage due to running. Coating is also more uniform.

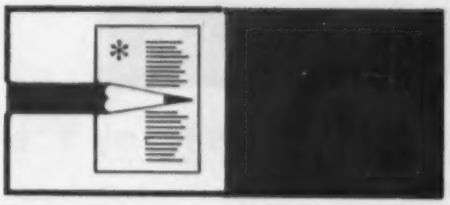
You'll find, at Crucible, dozens of *prescription-made* cold rolled steels designed for special applications . . . steels for automotive stampings, business machine parts, saw blades, cutting dies, skates, springs and cutlery – to name just a few.

You'll find them in the widest possible variety – including carbon spring, alloy and stainless steels – in fact, in *any* ferrous analysis that can be cold rolled. And you're *sure* of *quality* at Crucible – the nation's leading producer of *special purpose steels* – for Crucible maintains *complete* control of production from ore to finished steel.

So when you need prompt delivery of *any* kind of cold rolled specialty steel *call Crucible.* Experienced Crucible metallurgists can help, too, in selecting the *best* steels for your job. And write for your free copy of Crucible's new 32-page booklet on cold rolled specialty steels. It's packed with useful data. *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 30, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America



COPPER: It's Reached the Crisis Point

Prolonged copper strike has created an impossible supply problem . . . There was a scarcity of the metal even before the strike . . . Now fabricators are being forced to shut down . . . Price rise likely.

◆ COPPER SHORTAGE plus copper strike add up to copper crisis. And that's what industry faces right now. Steel and aluminum are tight too, but compared with copper they're coming out consumers' ears.

Outlook for the future so far as copper users are concerned is only slightly better than at present—and that's because conditions just can't get any worse.

Even with the now more than month long copper strike coming to an end it will take quite a while to fill up pipelines, so don't look for any easing of copper supplies right after the strike is settled. And even when copper is available there will be a flood of pent up buying as copper users try to fill orders they couldn't handle while the strike was on.

Finally when the market returns to "normal" scarcity, copper users will be trying to rebuild their inventories. What it all adds up to is a certainty that copper will remain extremely tight throughout the rest of this year and the scramble will continue into 1956.

Price Hike Coming

Copper users have another problem too. Despite the strong effort by producers to hold the line on prices, another hike seems inevitable, and it should come fairly soon.

Many people still believe there won't be another copper price boost, but the pressure building up for a price increase has hit the blow-the-top reading.

Price of primary metal has already been upped twice this year, from 30¢ per lb to 33¢, and then from 33¢ to 36¢. Next price boost will probably be to 39¢ or possibly even 40¢.

Right now, copper users are paying as much as 50¢ or more outside the market. And economist Eliot Janeway, who has called every turn on copper in the last few years, believes the price will eventually end up at 50¢ per lb.

Power Needs Boost Copper

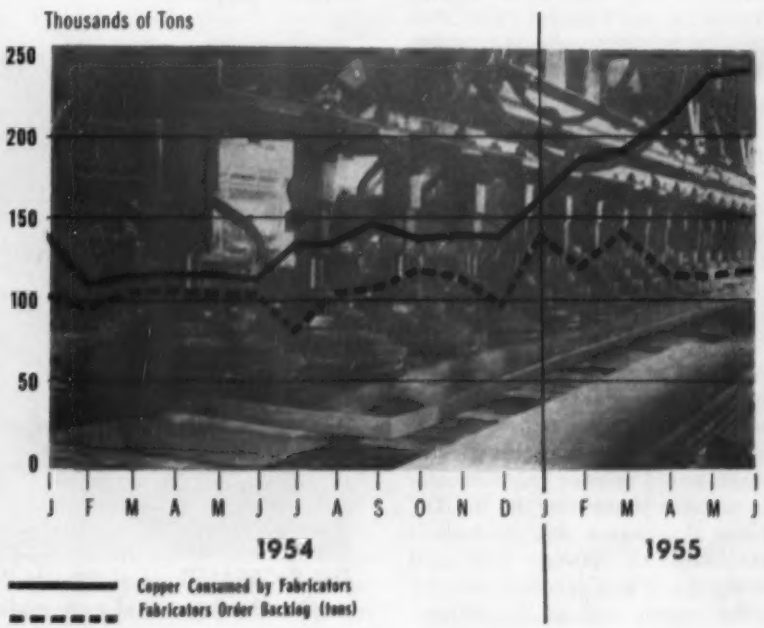
Those who don't see a copper price hike coming maintain the price is already too high and that if it is boosted again there will be a mass switch by industry to substitute metals. But this seems unlikely.

Demand for copper at almost any price is assured, for copper is still the best metal for electrical uses. With the nation in dire need of a complete rewiring job to handle the power demands for the new appliances that are added to the home each year, there has to be ever increasing demand for copper for this one use alone. Boom for air conditioning industry is a particularly important factor along this line.

Forced to Close Down

The current strike has put the floodlight on the copper scarcity, but actually the shortage began last summer. It partly was the

Strike may force lines to cross



same old story of inventory cutbacks and decreased production during the recession months of 1954. Then when demand began to pick up there were a series of strike of mines in Northern Rhodesia and Chile which cut production considerably. With Europe booming and our own economy going full blast, demand for copper has been increasing steadily. The strike has only aggravated a shortage that already existed.

Scarcity has reached the point now that many copper fabricators plants have been forced to shut down because they can't get enough metal to stay in operation; others are hoping to squeak along by shortening their workweek.

Prices have been skyrocketing too. Late last week copper on the London Metal Exchange was being quoted at more than 45¢ per lb. And here copper scrap is rising sharply, particularly in the last few weeks.

Since the beginning of this year price of copper scrap has risen from around 30¢ per lb to around 37¢. And the price of brass ingots has also been boosted about 7¢ per lb.

And copper fabricators of course are passing on these price increases. Just last week Mueller Brass Co. and General Cable were among several companies who boosted prices.

Severity of the copper shortage shows up in statistics on stocks of refined copper in producers' hands. At the beginning of the year producers' stocks amounted to 88,000 tons. Now stocks are down to 38,533 tons. By the time the strike is over they will have dropped off considerably more.

So far not much help has been forthcoming from the government, mainly because there's not too much it can do. Late last week it seemed probable that the government would release the slim copper stocks remaining in the Defense Production Act stockpile—estimated at between 2500 and 4000 tons. It was expected that the DPA copper will go to defense.

ROADS: Made With Rails

Dual purpose makes plate steel rails most efficient in concrete road construction . . . Modern models feature top efficiency . . . Conditions decree continued development

◆ GREAT BULK of this country's road building program is literally riding the rails.

Road rails are used extensively because they serve the dual purpose of providing the form for a concrete road and at the same time a set of rails on which the road surfacing machines run.

Demand for road rails runs well over one million feet per year. Replacement need is high because life of a road rail is about four average road jobs, from 2 to 5 miles.

Weight of an average size road rail is about 25 lb per lineal foot which means a fair sized market for ¼ in. plate.

The use of steel in road forms originated around 1912 when universal road forms of 10 to 12 gauge steel put in their first appearance. In the next 7 years use of steel road forms boomed as the country launched a hard surface road construction program.

In 1919 the first road surfacing machines were developed. This new method of road construction required steel road forms with added strength to support the new equipment. Modification of design greatly improved road rail efficiency but today's models have the same basic design as their predecessors 35 years ago.

Currently, production of road rails is handled by a handful of manufacturers with the two principal producers, Blaw-Knox Co. and Heltzel Steel Form & Iron Co., accounting for about 90 pct of total output.

Extensive programs now planned assure continued use of road rails and continued steel plate demand for this use. Traffic on our highways is far above road capacity. In ten years the situation will be twice as critical. Our highway system has to be expanded and most of these building programs call for concrete surfaces—built with miles and miles of road rails.

THE INCREASED use of the ride the rails road building technique directly parallels development of more modern road surfacing equipment.

STEEL: Record Year For Records

Increase in general demand pushes earnings, production bookings to all-time high . . . Producers still view future with rose colored glasses . . . Record year in sight.

◆ THE OPTIMISM expressed by the nation's steel producers at the beginning of this year has been borne out beyond their expectations. The industry found itself looking at full order books for third and fourth quarters and at the same time trying desperately to maintain production at a high level. It was handicapped by maintenance and hot weather conditions in the mills.

Increased demand forced the mills to operate at near or over their rated capacities, driving production statistics to dizzy heights. Total sales and net earnings found new ceilings. And many companies report sizable books of unfilled orders.

Steel producers are optimistic, see a good possibility for an all-time record year. Declared C. M. White, president of Republic Steel, "One of the encouraging factors is that business in general has reduced inventories below their ordinary levels. As a result steel demand is widespread and not confined to a few industries. There is every evidence that fourth quarter operations will be . . . in excess of the second quarter."

DEMAND: The construction industry has shown perhaps the greatest increase in demand. Eugene Grace, chairman of Bethlehem Steel described this market as "going wild." A normal seasonal decline is to be expected but the total tonnage will be higher than in any previous year.

The railroads can probably be counted on to pick up where construction leaves off. After a slow start the railroads seem to be trying to come alive. There is every indication that their last half orders will be in excess of their demand for the initial half.

Orders from the shipbuilding industry have maintained a pace consistent with the trend established in the last couple of years. However, with delayed deliveries becoming more the rule than the exception, orders from this source will increase.

LABOR: The rapid settlement of labor issues after a short walkout helped prevent output from falling too far behind the record pace. But despite the shortness of the idle period, mills are still trying to recover lost time which, in effect, is many times over the 12-hour strike period. Steelworkers received the equivalent of a 15¢ package after bargaining which saw USW holding the aces.

EXPANSION: Steel producers have served notice that they are definitely taking the offensive. Extensive expansion programs are planned by many in anticipation of continued demand.

Following are some of the current expansion programs planned or under way among some of the leading steelmakers to keep pace with demand:

John M. Curley, president of Eastern Stainless Steel Corp., Baltimore, announced that his organization would put a new arc melting furnace into operation for the fall. Eastern's earnings for the quarter were the highest ever despite the fact that profits were lost by the purchase of some semi-finished steel from outside sources made necessary because demand so exceeded capacity.

George R. Hook, chairman of Armco, announced a $60 million expansion program to be "well underway." Armco's initial 6 month earnings were also a new company record.

Roger M. Blough, chairman of U. S. Steel, declared that $467 million would be expended on authorized projects.

Bethlehem chairman Eugene Grace declared that $16 million had already been authorized for expansion with another $160 million yet to come.

EXPORT: The export outlook is good—so good in fact that Bethlehem and some of the other producers have closed their books to orders for export for the remainder of the year. The percentage of steel for overseas consumption will remain about the same indicating an increase in tonnage.

Records Sure

Should domestic industry fail to buy all of the steel being produced, this outlet could be the ace-in-the-hole for continued record earnings.

Considering the current demand and potential there seems to be no doubt that 1955 is due to be steel's record year for records.

Steel Company Earnings

	Second Quarter 1955	Second Quarter 1954
U. S. Steel	$109,225,558	$49,020,736
Bethlehem Steel	47,006,062	30,756,412
Republic	22,944,606	13,712,933
Jones & Laughlin	12,926,000	6,328,000
National	11,829,410	6,605,123
Youngstown Sheet & Tube	10,031,014	6,061,216
Inland	12,987,097	9,954,419
Colorado Fuel & Iron		1,416,768
Wheeling	3,763,273	3,247,630
Sharon	2,256,731	573,646
Crucible	4,036,579	782,479
Pittsburgh	1,695,000	516,023
Granite City	3,199,499	719,446
Allegheny Ludlum	4,004,747	826,221
Northwestern		
Lukens	951,048	101,786
Detroit		329,783 (loss)
Alan Wood	622,500	262,107
Rotary Electric	1,094,436	448,664
Continental	985,293	579,664
Acme	1,851,589	783,788
Armco	15,331,411	9,963,891

INTERNATIONAL

GERMANY: Rearmament and World Trade

All agree defensive army a must . . . But industry not geared for full military and export goods production . . . Manpower, capital critical factors . . . NATO and German leaders differ on timetable.

♦ GERMANY must be able to support and defend herself. But there seems to be qute a gap between agreement on the intended result and solution of the obstacles.

German industry is operating at its postwar peak. But this industrial prosperity must of necessity be aimed at putting the country back into the world market. Germany must import food and raw materials and seeks to balance this by export of machinery, steel goods and industrial equipment.

If the German manufacturers produce armaments then there will be a proportionate decline in the equipment for export and a corresponding weakening of the economic structure and standard of living.

For example, the German automotive industry last year produced 68,000 trucks, of which 31,000 were exported. If the new German army were organized on a basis of full strength in 3 years it would require 71000 trucks in 1956-59.

This would necessitate either a sharp rise in production or a sharp decline in export. The former would require considerable new capital which does not seem available. And Minister of Economy Herr Ehrhard has already declared that he would rather resign than advocate a reduction in the export program.

And there are other problems, the most critical of which seems to be manpower. About 150,000 men will be needed. Thus far 115,000 have volunteered but only 18,760 in the 18-24 age group. And about one-third of these will have to be rejected.

A draft is necessary. But the Free Liberal Democrat — Socialist —Christian Democrat parliament has its ear tuned to the lament of industry and agriculture on the dearth of skilled artisans and labor in general. The sharp decline in the birth rate in the 1940-47 period is being felt.

Stockpile Arms

The U. S. forces in Europe well recognized the difficulties involved and have taken steps to alleviate the problem. The goal is four armored divisions, four mechanized divisions, four infantry divisions and a tactical air force of about 12 wings.

At Kaiserlautern Palatinate the U. S. has stockpiled teeth for the new prospective army—arms and equipment. Unfortunately, a majority of this equipment was manufactured for World War II and is now obsolete. But it will have to be used for training the German army.

Time Too Short

German industrialists believe that the underlying difficulty of the entire problem is the time element. They would like to see a defensive Germany army because they realize that their survival depends on it. But not at the cost of their standard of living or the economic stability they have been striving to establish. They insist that the NATO plan of full development by 1959 cannot work.

Most industrial and military experts speak in terms of 12 years, some 14-15 and a few optimists of 10.

They say the financial question can be settled, requiring approxiately $2.3 billion annually of a total German income of $36 billion, but production and labor questions will make it imperative to spread rearmament over a period of at least 12 years.

It appears that Germany intends to be ready economically and defensively—but not until 1968.

VISITING Americans are applying advanced American techniques to the ailing European economy. This group consists of agricultural experts.

SINTERING PLANTS: Cinderella of Steel

Need for more hot pig iron critical . . . Stage set for glass slipper era for heretofore lowliest section of steel mill . . . Estimate 5 year amortization used on raw ore—By T. M. Rohan.

◆ WITH BLAST furnaces being pushed for all they're worth to produce more hot pig iron for the openhearths, the stage is set for any method that will increase output. And stepping in to help fill the gap, like a long patient understudy to the leading lady, is the sintering plant which has long been primarily a recovery operation for flue dust. In its new role it is becoming an integral part of ore beneficiating systems heralding the end of the days of 6 in. lump ore charges to furnaces.

Next month Weirton Steel will start operation of a new 8 ft. wide unit at Weirton, W. Va. Bethlehem is building two additional machines, each 6 feet wide, at Sparrows Point, Md., making a total of four machines at this plant. Fairless Works recently announced the start of construction on a single line plant.

In Pittsburgh last month U. S. Steel announced plans for a $25 million sintering plant project at Houseville, Pa. to serve its Pittsburgh area mills. Similar plans are also under way for the Chicago area mills. In the West, Kaiser Engineers are designing a major sintering plant for the Fontana mill in addition to the two 1600 tons per day units now in service. With flue dust there only 80 lbs. per ton of iron, among lowest in the country, the present units are intended primarily to recover 6 pct iron in screenings and tailings. Steel Co. of Canada also completed a major sintering plant this year at Hamilton, Ont. using German equipment. Jones & Laughlin boosts a sintering operation at its Benson mines in New York with an annual cacapacity of 1,600,000 tons.

And on the occasion of its 50th anniversary this month, Arthur G. McKee Co. of Cleveland, steel mill designers and builders, announced plans for the world's largest single strand ore sintering plant for an eastern steel mill. This plant will produce 4000 tons per day of sinter on a 168 ft. long, 8 ft. wide grate using ore fines and flue dust.

KAISER'S Fontana mill is one of the pioneers in the development of the sintering plant for faster and more economical iron ore beneficiating.

Merrill Cox, McKee vice president, told the IRON AGE that although grates up to 12 ft. wide are used on zinc and 10 ft. wide units are used on lead in Canada, this will be the largest grate area and hence the largest capacity machine for iron ore.

The sintering plant is becoming the belle of the production ball due to the heavy influx of foreign ores into the U. S. (estimated at over 20 million tons this year) which have a high percentage of fines, and to the increasing use of fines from domestic ores. With sintering of these ores, blast furnace production can be increased as much as 10 pct. And sintering plants used on raw ore will amortize themselves in about 5 years.

Iron Strike:

South American deposit 6th or 7th largest in world

H. A. Brassert & Co., an American engineering firm, reports that preliminary drilling at Mutun near the Paraguay River in the Far Eastern tip of Bolivia indicates a deposit of enough iron ore to make it the 6th or 7th largest in the free world.

The average quality of the ore, according to J. E. Brassert, is 50-55 pct metallic iron.

In addition to the size of the deposit the importance assigned to the discovery is based on the geographic location. The proximity of the Paraguay River, navigable by ore barges for about 10 months of the year, makes possible the facile export of the ore to both North and South American consumers.

GOVERNMENT

WOC: Politics Endangers Program

Investigators attack businessmen who serve without pay . . . Charge company ties work against government interest . . . Sniping discourages U. S. service, looks like political move—By *N. R. Regelmbal.*

◆ FUTURE of the program under which top industry executives donate their time and services to government is in danger from two fronts: tighter restrictions on their use in government and reluctance of top men to come to Washington. All this is a result of current investigations into the business executive program.

Government officials are frankly worried that the investigations, sparkplugged mostly by Democrats seeking campaign issues, will seriously impair the program.

Current investigation being conducted by Rep. Emanuel Celler, D., N. Y., is billed as an "inquiry" into the policies under which industry men operate as heads of various advisory bureaus in government, particularly the U. S. Commerce Department's Business and Defense Services Administration.

Seek to Discredit

Rep. Celler says his investigation is purely "non-political," and will look into use of industry advisers (called WOCs, for without compensation) under both Democratic and Republican administrations.

But the direction taken at the hearings indicates that Rep. Celler and his staff are trying to show that WOCs are placed in positions where they can influence government actions; that because they are unpaid, their allegiance is to their employing firms; and there are chances for unethical practices, and finally that these men are "businessmen."

Later, in election campaigns, the plan is apparently to link business advisers to the Republican party, even those who served under Democratic leaderships, in order to whip up a much-needed issue.

Committee Charges

So far, here are some of the major points made by the subcommittee:

The Commerce Dept. has been attempting to "obstruct" the hearings, by refusing, or dallying, in producing files on WOCs. (Answer given is that the volume of information requested will in most cases be supplied, but it will take time, and that some exchanges between the department and business are confidential.)

Halted Aluminum

That the Aluminum & Magnesium division of BDSA, when headed by an official of a major aluminum company last year, recommended against government sponsorship of a third round of aluminum expansion, that this may have been done to limit supply, and it may be partly responsible for the current shortages. (It was pointed out that when the recommendation was made, there was an oversupply of the metal, and that producers were exercising their option and requiring the government to buy excess production.)

That BDSA had attempted to "interfere" with Justice Dept. antitrust activities. (Explanation given is that industry point of view was simply presented to the antitrust officials.)

That BDSA and the Commerce Dept. took the view of industry and worked to "get the government out of competition with private industry" without regard to whether national security was affected. (Explanation given again was that it was the function of the officials to transmit industry opinion, but final decisions are made by agencies involved.)

"Dark Horse Candidate"

Stigma Hurts

Immediate outlook is that WOCs will be required to submit sworn statements of business and financial interests, keep them up to date, and be restricted in making decisions involving firms in which they have an interest—provisions generally covered by an executive order issued by former President Truman in 1950 and still in effect.

Long-range outlook, however, is much bleaker because of the public stigma being attached to the WOC jobs. Should the investigation, although still a fishing expedition without much of a bite late last week, turn some "evidence," other executives will think twice before coming to Washington where any slip in judgment might result in damaging charges by politicians.

There is no doubt that executives planning to offer their services to government activities will closely scan subcommittee investigation findings.

STEEL: From Art to Industry

From "tin" suits to tin cans . . . The 15th Century armorer started it all . . . Now commemorated by the industry he pioneered.

ABOUT the year 1540 the tenant of this steel sheath, now dominating the armor exhibit, roamed Germany

IN WORKSHOPS like this with crude tools and techniques the 15th century armorer laid the foundation for the modern pressed steel industry.

◆ THE LESSONS learned from the armorer of the 15th century set the pattern and the precedent for the modern, pressed steel industry. In recognition of this fact the Worcester Pressed Steel Company of Worcester, Mass., has constructed in a building of steel and glass a massive tribute to earlier metalworkers known as the Higgins Armory, the building is a faithful reproduction of a castle, complete with Gothic vaults and grained arches. And in the great hall in all their panoply are dozens of knights in shining armor, mounted and afoot, superb examples of the ancient armorers art.

The armorer, more artist than artisan, utilized water-driven trip hammers and hand tools to pound steel plate into swords and mace resistant uniforms. Today's pressed steel industry has borrowed from this ancient art to turn out automobile bodies, pots and pans, and other vital items.

Thousands of visitors visit the museum each year. A good example of the impact of the exhibit is a young schoolboy who went home and made his own suit of armor out of his mother's coffee cans and a pudding mold.

THIS MODEL was the final exam for an apprentice seeking graduation to status journeyman. He passed.

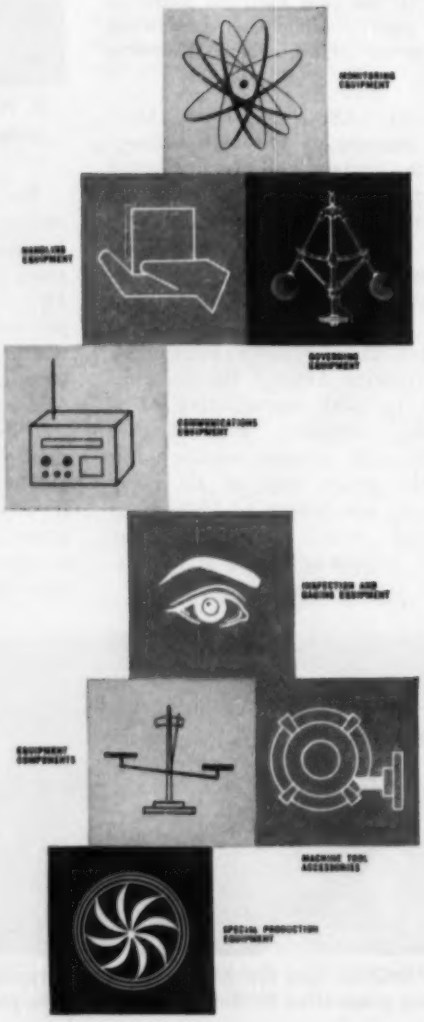
7000 classic, examples of the ancient armorer's art guard the Great Hall of the faithfully reproduced German Gothic castle.

the PRODUCTION ENGINEERING SHOW

SEPTEMBER 6-16, 1955
NAVY PIER, CHICAGO

The Automation Exposition

See the devices, instruments, mechanisms and controls of automation you can apply right now!



An exposition that does something about AUTOMATION. Takes it out of the "blue sky" category. Shows you the practical things you can use to make production more automatic. Provides in one place, at one time, a comparison of the devices, instruments and controls to automate prime production equipment. Demonstrates how to integrate and control entire production lines to reduce costs and increase output.

The Production Engineering Show is a fitting companion to the great Machine Tool Show, held simultaneously in Chicago at the International Amphitheatre. See both shows. Your P.E.S. badge will admit you to the Machine Tool Show, too. And your M.T.S. badge will admit you to the Production Engineering Show. Write for tickets to:

Clapp & Poliak, Inc.
Dept. PES-2, 341 Madison Avenue,
New York 17, N. Y.

GRAIN: Surplus Tightens Steel Demand

Government grain bin program will impose new strain on galvanized sheet capacity . . . Plans call for bins to house 100 million bushels . . . Other consumers will have to tighten their belts—By *K. W. Bennett.*

◆ GOVERNMENT plans to launch a new grain storage bin program will superimpose added strain on galvanized sheet capacity.

Galvanized sheet has been sold out for the remainder of the year for many mills since second quarter. The addition of new continuous galvanizing lines this year (capacity estimate: 400,000 net tons annually) has failed to dent the high customer demand level. Grain storage bins to hold 100 million bushels, as proposed by the Government, would require at least 18,000 tons per month.

The demand pattern was foreshadowed last year. In April of 1954, Commodity Credit Corp. announced the purchase of 100 million bushels of additional grain storage space as the spring wheat harvest drew near. Galvanized sheet had been limping along at 84 to 88 pct of tonnages shipped in the same months of the year previous, 1953. When the April orders were announced, the April shipment tonnages for galvanized sheet bounced from 180,000 net tons in March to 202,00 in April.

In early July last year, CCC announced another 100 million bushel program. July tonnage of galvanized sheet rose from 200,000 net tons shipped in June to 214,000 net tons in July. Another 50 million bushels of bin space was suggested but available statistics suggest that only about 5 million bushels of this was actually let in contracts to build new grain storage bins.

Wood Bins No Solution

Bin builders put in a stock of galvanized sheet this spring expecting another letting of grain bin contracts to cover storage of spring wheat, and when these failed to materialize a few of them began selling the sheet out of their own stocks. An indication that despite the fairly high stocks of galvanized sheets accumulated this spring, present in-plant galvanized sheet stocks are low.

Whatever the galvanized picture, the lion's share of the bins will be metal.

Wooden bins haven't been the solution to a galvanized shortage in the past. Of the first 100 million bushels of storage space let in April last year, only 7.5 million bushels were wood. In the second letting there were only 1.5 million bushels of wood storage bins contracted.

Possible fabricators of the new bins include: Great Lakes Steel; Butler; Steel Company of Ohio; Dickinson-Leck Co.; Black, Sivalls and Bryson; Western Engineering & Contracting Co.; Columbian Steel Tank Co.; Steelcraft Mfg. Co.; Kilby Steel Co. and Ohio Machine Products Co. All of these did some work in last year's program.

"Usually Peggy's the first one to complain about the heat."

Grain Bin Storage Space

Held by Commodity Credit Corp.

1949— 44,000,000 bu.
1950—453,000,000 bu.
1951—545,000,000 bu.
1952—543,000,000 bu.
1953—543,000,000 bu.
1954—705,000,000 bu.
1955—845,000,000 bu.

(through July 19, 1955)

Belt Tightening in Order

It's all in preparation for the nation's second largest annual crop total. Feed grains alone will amount to 135.7 million tons. The record established in 1950 was 152.7 million tons. With the harvest approaching fabricators will need galvanized sheet in quantity as early as August, and will probably continue to require substantial tonnages at least through September and into early October.

The Department of Agriculture will get its bins but it is going to require some belt tightening.

Who's Who in Gov't

Newest edition of the 1955-56 "United States Government Organization Manual," listing the names and titles of about 4000 key officials, is now on sale.

The manual, which describes the organization of the government in 768-pages, is available from the Government Printing Office, Washington 25, D. C.

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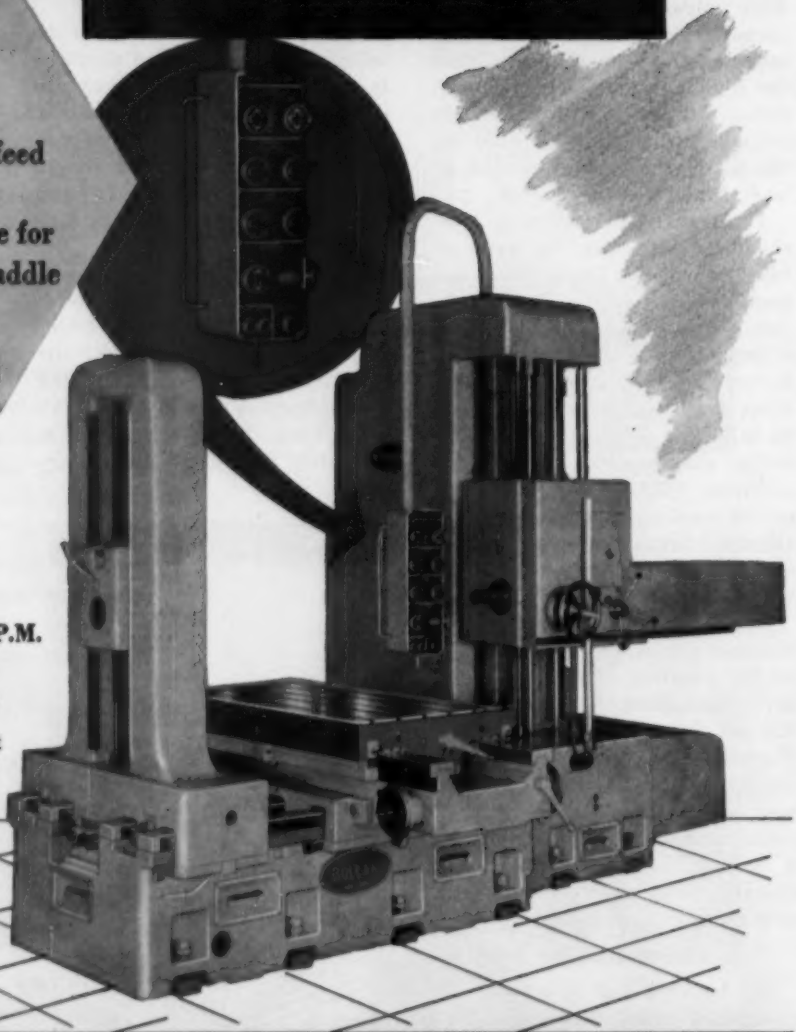
Complete machine control from a movable station for feed and speed selections, directional feed and traverse for Spindle, Head, Table and Saddle



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Both Screw and Rack Feed to the spindle

Massive 4-Way Bed, Head, Headpost and Rear Post for rigidity

Spindle Speed up to **2000 R.P.M.**

Replaceable Ways, chrome hardened, on Bed and Saddle

Optical measuring equipment for head and table (optional)

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Foreign Aid:

Military funds dominate aid for Europe, Asia.

Friendly foreign countries will have some $2.7 billion in U. S. funds to spend—much of it in this country—in the fiscal year which began July 1.

Congress, grudgingly on the part of many lawmakers, agreed to open the U. S. purse and dole out funds for military and economic aid at about the level of last year. This is a whopping $563,000,000 less than the President said he would need to beef up friendly foreign countries and block the spread of Communist influence.

Of the total, Europe will get $85.5 million in military aid, but nothing for economic assistance. It is the first year that economic aid funds have been cut off to the continent.

Restored Some

Asia will get $825 million for military assistance, and some $100 million for developmental assistance. The President had asked $200 million to start economic aid to Asia.

The House originally cut some $600 million from the President's program, but later agreed to restore $100 million.

Total appropriations for foreign aid since the original Marshall Plan first went into effect in 1948 have totaled about $57 billion, including this year's grants.

Actual spending has amounted to $30.8 billion. There is now a balance estimated at about $8.4 billion in unspent funds appropriated in previous years—enough to keep the spending program going for 2 years if no additional funds were voted, according to some congressional opponents who fought the larger appropriation.

Okay British Planes

Through the end of June, the U. S. has delivered more than 6400 planes, 900 naval vessels, 37,000 tanks and combat vehicles, over 200,000 transport vehicles, billions of rounds of ammunition, and other items under military assistance alone.

Proposals to block any of the aid money being spent in the British military aircraft industry, which critics claim is using U. S. dollars to compete with domestic firms, was defeated during debate on mammoth money measure.

Critics of foreign aid are blasting government actions in obligating an estimated $700 million in obligated balances in the final hours of the last fiscal year to prevent the money's having to be returned to the Treasury. But the lawmakers did permit the Defense Dept. to carry over $302 million in unspent military aid funds which was due to lapse.

Fill Columbium Pile

Stockpile purchase of columbium-tantalum pentoxides is being shut off at ore buying stations because the government's buying program has already exceeded the 15 million lb goal established in 1952.

General Services Administration says that cutbacks of outstanding orders will be required so that the original goal will not be "unduly" exceeded. Cutbacks will be made on an across the board percentage basis on all outstanding purchase agreements. The ores are sources of both columbium and tantalum, used in steel production.

DEFENSE

Seek Plant Sites

Military emphasis on guided missiles has the Air Force scouting around for plants with facilities capable of turning out the complex new weapons. Air Force bosses are looking over at least five possible sites for a guided missile plant to be operated by Boeing.

Among the sites under consideration are the existing Air Force plants at St. Louis, Omaha, and Tonawanda, N. Y., and undeveloped sites at Denver and Salt Lake City.

Grant More Tax Aid

Certificates of Necessity permitting fast tax amortization for another $47.7 million were issued by the Office of Defense Mobilization in the two weeks ending July 13.

Largest of the 40 certificates issued were to: Consumers Power Co., Muskegon, Mich., 35 pct of $18.2 million for electric power generating facilities; Aerojet-General Corp., Sacramento County, Calif., 70 pct of $6.5 million for research and development.

X MARKS the spot, only 50 ft sq, required for the vertical take-off and landing of this U. S. Navy XFY1 "Pogo" fighter plane built by Convair.

EXPANSION IN INDUSTRY

Mining:

Kaiser Steel pays $3.5 million for New Mexico coal property.

Kaiser Steel Corp., Oakland, Calif., has purchased the real estate and mining properties of the St. Louis, Rocky Mountain & Pacific Co., Raton, New Mexico.

The acquisition involves title to 202,950 acres of coal-bearing land plus coal mining rights on an additional 326,854 acres. Purchase price was $3.5 million.

The reserves are estimated to be sufficient to supply company requirements at the present rate of consumption for hundreds of years.

Kaiser presently derives 1.5 million tons of coal annually from its mine at Sunnyside, Utah. It's estimated that reserves from this source will meet blast furnace demand of the company's Fontana, Calif., steel mill for more than 70 years.

Substantial shipments of coking coal have already been made from the Raton mine to Fontana for testing and development. No step up in enlargement of the New Mexico coking coal operation is planned at present, however.

Will Boost Capacity

Wilcox Trend Gathering System, Inc., subsidiary of Texas Eastern Transmission Corp., Shreveport, La., has received Federal Power Commission approval for additions to its system which will increase Wilcox's capacity to approximately 200,000 MCF of gas per day.

Cost of the project is estimated at $2.9 million.

The proposed facilities include a new 2000 hp compressor station; additional compression totaling 2200 hp to be added to the company's existing station near Thomaston, Tex.; 16 mi of 16-in. pipeline looping a portion of the company's main line; some additional smaller diameter lines, and a 75 hp field compressor station.

Ups Production Area

The Hallden Machine Co., Thomaston, Conn., has completed construction of additional plant facilities which has increased manufacturing floor space by 60 pct.

Increased installations are geared to meet stepped up customer demand for larger type automatic shears used by the metal producing and fabricating industries.

The firm is a pioneer in the development of automatic guillotine and rotary type shears and straightening equipment for sheet and wire.

Aimed At Wire Output

Work is currently underway at General Electric Co.'s Distribution Transformer Dept., Pittsfield, Mass., on a $600,000 building and equipment project for production of resin-insulated wire.

The enlarged facilities will turn out increased quantitites of the Dept.'s Formex wire for use in transformers and other electrical equipment.

Six Formex oven units will be installed and operating at the plant by July, 1956. Each unit will be able to process about 18,000 lb of copper per week.

Ore Unloader:

Pennsylvania RR adds third unit to $11 million pier.

Capacity of the Pennsylvania RR's new $11 million ore pier at Greenwich Point, Philadelphia, has been increased 50 pct with the addition of a third ore-unloading machine recently placed in operation.

Built by the Dravo Corp., the electrically powered unit can unload 5400 tons of ore per hr. This is reported to be the fastest railroad-owned bulk unloading facility on the Atlantic Coast. Like the pier's other two ore unloaders, the machine unloads ship holds in 25-ton bites every 45 sec.

Placed in operation last year, the pier handles ore shipments from South America, Labrador, Africa and other foreign points. Its capacity can be expanded to include six ore unloaders handling four vessels simultaneously.

The unloading facilities serve the steel producing areas of Western Pennsylvania, the Middle West, and many eastern steel plants.

Erect New Facilities

A combined office, research, and distribution center costing over $2 million will be erected in Rahway, N. J., by Metal & Thermit Corp. Construction is slated for completion in April of next year.

Plans also call for transfer of the firm's executive offices to new quarters in New York City.

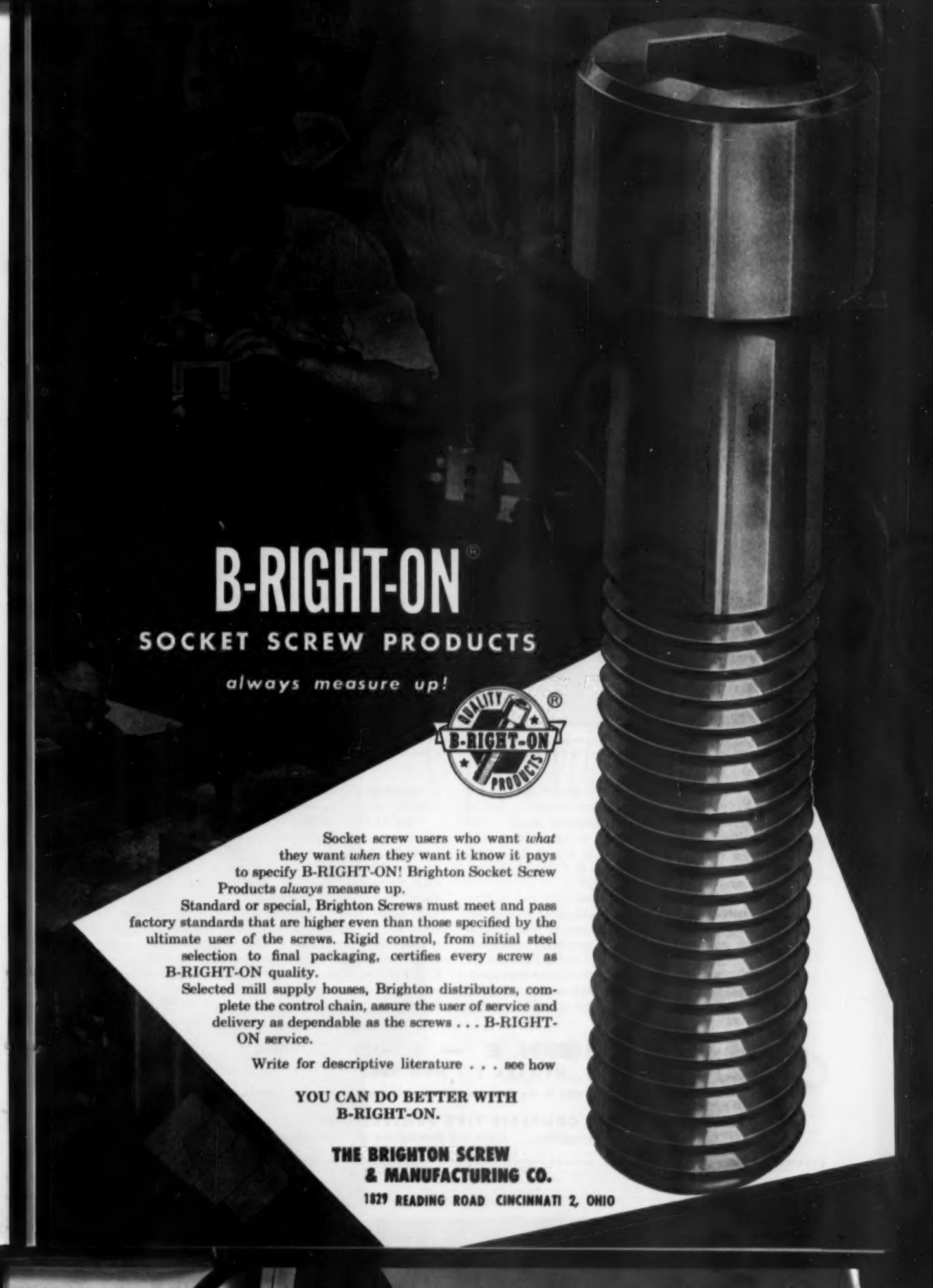
Warehouse installation at the new site will provide storage and distribution facilities for all company products.

Build Giant Turbine

Plans for constructing a 40,000-kw single automatic-extraction condensing unit—said to be the largest steam turbine-generator in the paper industry—have been completed by General Electric Co., Lynn, Mass., for installation at International Paper Co.'s new $20 million newsprint mill at Mobile, Ala.

Shipment of the unit to the mill now under construction is scheduled for the middle of 1956.

The turbine for the unit will operate at a throttle pressure of 1450 lbs per sq in. at 1000°F.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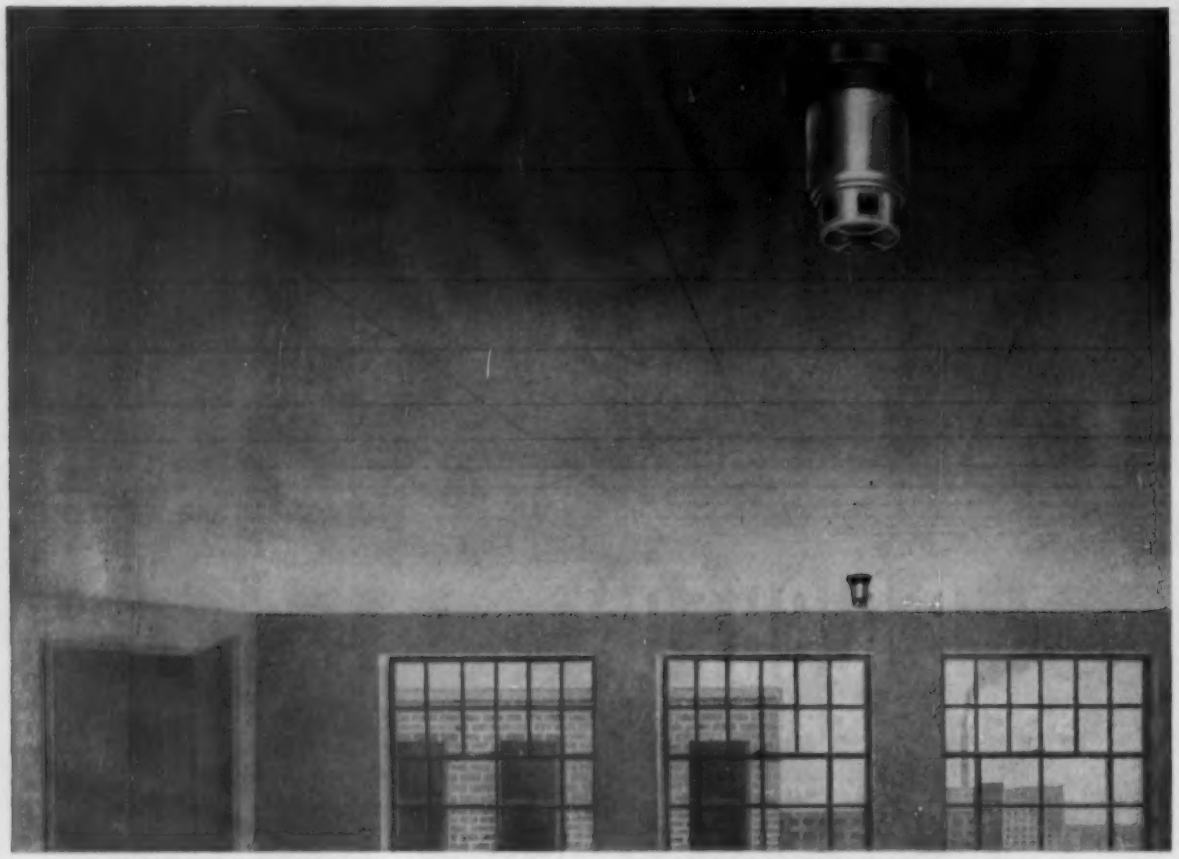
1829 READING ROAD CINCINNATI 2, OHIO

New, radio-active, automatic fire guard!

C-O-TWO PRE-DETECTOR SYSTEM



Each pre-detector head protects up to 3,600 square feet of area . . . harmless radio-active element utilizing ionization chamber principle quickly detects all forms of fire . . . requires only simple two-wire circuit and insignificant wall space for controls.

This completely new and positive means of spotting fire is just what you've always needed and wanted . . . detects in the earliest stage, invisible combustion gases, visible smoke, slow smoldering, as well as open flame. The C-O-TWO Pre-Detector System is simple to install, extremely economical to maintain and doesn't depend on thick smoke or heat for actuation.

As many pre-detector heads as necessary can be connected together in a single circuit and up to 16 separate circuits or spaces handled by one system. With a single circuit the pre-detector heads are connected directly to the fire indicating cabinet, while with multiple circuits the pre-detector heads are first connected to one or more space indicating cabinets capable of visually showing by number the exact location of the fire. Relays perform such functions as sounding alarms, closing fire doors, shutting down ventilation and releasing fire extinguishing systems.

The C-O-TWO Pre-Detector System has been subjected to extensive testing and carries Underwriters' Laboratories, Inc. listing, as well as Factory Mutual Laboratories approval. Proven pilot installations have been made in such diversified properties as a television station, an electric power company network analyzer room, a railroad signal tower, an airline flight training equipment room and the offices of an insurance company.

Don't take unnecessary chances any longer . . . the extensive fire protection experience of PYRENE—C-O-TWO over the years is at your disposal without obligation. Get complete facts about this new C-O-TWO Pre-Detector System today!

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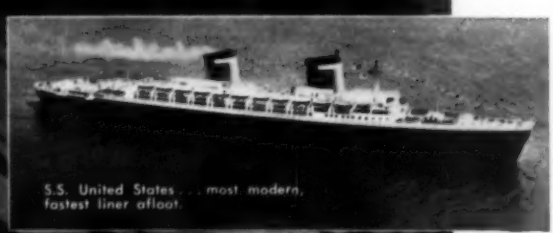

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Nothing finer!

A statement from
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"Our records show that when a manufacturer once discovers the uniform quality of Roebling flat spring steel, he becomes a steady Roebling customer."

You, too, *pay* for the best spring steel . . . make sure you *get* it. Specify Roebling. John A. Roebling's Sons Corporation, Trenton 2, N. J.

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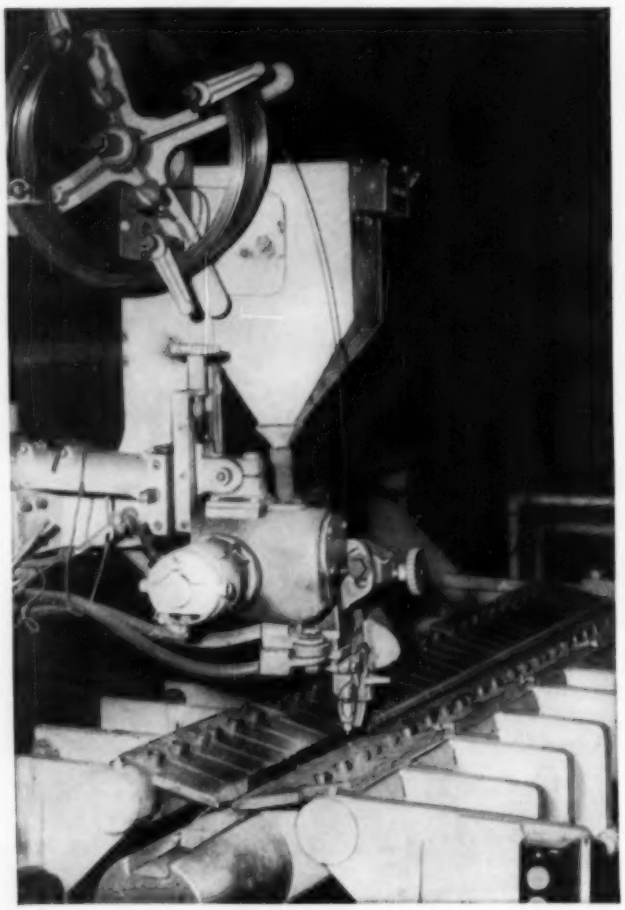
CUT *maintenance costs on tough welding jobs*

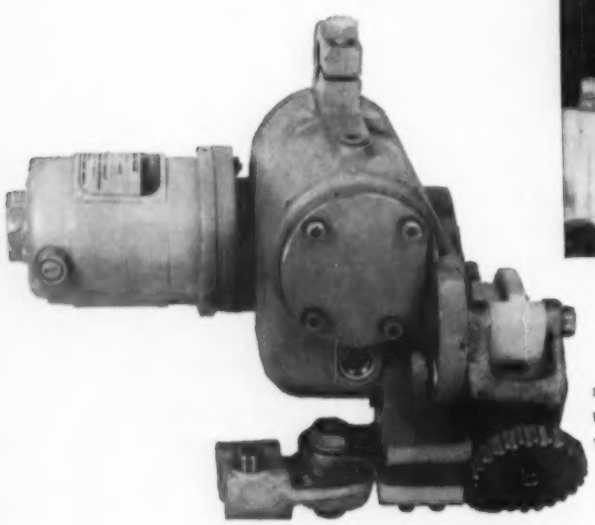
with the New UNIONMELT DSH *welding head*

Trade-Mark

Here's the low cost, submerged melt welding head that saves maintenance costs on tough welding operations. The new UNIONMELT DSH head combines the flexibility of the lighter units with the ruggedness needed in heavy-duty welding machines. Large, sturdy gears and bearings give long, trouble-free service though work may involve frequent starts and stops and feeding heavy electrode wire. Simple controls and mounting arrangements make the DSH head easy to operate and maintain.

UNIONMELT welding joins thin metals at speeds up to 200 in. per minute or makes one-pass welds with a 3-inch penetration if desired. If you have a production job in your plant that requires high-quality welds made at high speeds, ask your nearest LINDE Office today for more information about UNIONMELT welding. A LINDE Engineer will be glad to help you plan your UNIONMELT installation for high-speed, production welding.





With the new UNIONMELT DSH head now available in five output speeds, you can select the best unit you need for making high-quality low-cost welds at the highest welding speeds.

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Linde

Trade-Mark

Report To Management

Which Comes First?
The old chicken-or-egg stumper has an economic counterpart. Does confidence lead to spending and put money in circulation? Or does cash on hand create confidence and lead to spending?

A little of both is probably the answer. One fosters the other. But there's no doubt that the current spending spree has been based on expectations as well as assets.

Commercial bank loans to business rose about $2 billion during the first 6 months of 1955, reversing a 3-year trend. Loans to consumers increased $1 billion during the first half.

Planners Urge Caution
Washington financial experts are grumbling a little about the nation's loose borrowing ways. Treasury Secretary Humphrey urges business and the public to be prudent in money matters.

Federal Reserve Bank has taken steps to reduce the supply of money available for lending. The Bank hints at sterner measures, warns members that summer loans will receive special attention from examiners.

But tough credit curbs aren't likely. Government no longer has authority to regulate consumer down payments and repayment periods. And indirect measures won't be pushed by an Administration that got burned in its one ill-timed venture into credit restraints.

Why Tinker With Economy?
The idea of balancing the economy by throttling credit and spending hangs on. But the fact is, confidence and credit have produced a very solid boom.

Personal income reached an all-time high of $301.1 billion (annual rate) in May. General Motors reported record payroll figures for the first half and the second quarter of 1955.

People aren't broke or crazy. Savings jumped more than $2 billion in the second quarter. They just want more shiny cars and TV sets. And they're not afraid to use next week's paycheck for buying.

Business Guessed Right
First quarter business figures show an equally healthy picture. Profits of manufacturing firms hit a 4-year high of $3.3 billion.

Sales of same firms were $65.6 billion for this period against $60.9 billion last year. Annual rate of return on stockholders' equity was 11.4 pct against 9.4 pct for the first 3 months of 1954.

Business failures dropped to 172, lowest level so far this year, in the week ending July 21. For the year to date, failures are 88 less than in 1954.

What They Forget
Advocates of supervised spending keep underestimating the ability of our production machine to accelerate. Supply is behind demand. Copper, steel and others will stay tight for some time.

But production figures warn against any attempt to curb buying power. Rail car loadings for the week ending July 16 totaled 799,040 —15 pct more than in the same 1954 week. TV sets shipped to dealers in the first 5 months of this year were nearly 13 pct above the same period of 1954.

Retail sales continue at record levels for this time of year. Paperboard production, often an indicator of total industrial output, rose 45 pct in the week ending July 22.

INDUSTRIAL BRIEFS

Atomic Industry Trade Fair . . . Byron Jackson Co. will participate in the first trade fair being held in conjunction with the Annual Fall Meeting of the Atomic Industrial Forum, in Washington, D. C., September 27-29. Marketing products of Atomic Energy is the theme. Byron Jackson's exhibit will consist of pumping equipment used in handling radio-active materials and electronic instruments for nuclear reactors.

New Levittown Office . . . As of Aug. 1, a new sales and service branch of the Cleveland Pneumatic Tool Co., will be located at 3000 Hempstead Turnpike, Levittown, New York.

Wire Rope Elevators . . . Wickwire Spencer Steel Div. of Colorado Fuel & Iron Corp., has received an order from the Beverly Hilton Hotel, Beverly Hills, Calif., for heavy wire rope for elevators. Installation and service will be handled by the Elevator Maintenance Co.

Magnesium Mill . . . Copper & Brass Sales, Inc., Detroit, has been appointed a distributor of magnesium mill products for the Dow Chemical Co. This appointment brings to five the number of firms distributing Dow's magnesium products.

Precision Instrument Display . . . Challenge Machinery Co. of Grand Haven, Mich., will occupy Booth No. 529, at the Machine Tool Show in Chicago, September 6-17. Challenge's display will consist of layout surface plates in both semi-steel and clovis-black granite, "clamp-edge" layout plates, welding tables, reading tables, checking tables, adjustable floor plates, bench plates, and lapping plates.

South American Market . . . De Laval Steam Turbine Corp., Trenton, N. J., has appointed L. Henriques & Cia, Guayaquil, Ecuador, as their exclusive Ecuadorian representative.

New Plant . . . BECCO Chemical Div. of the Food Machinery and Chemical Corp., Buffalo, N. Y., is planning a multi-million dollar plant expansion program involving the hydrogen peroxide producing facilities at Buffalo, New York and Vancouver, Washington.

New Plant . . . Detrex Corp. has started production at the new $1,500,000 plant in Bowling Green, Ky. This plant will produce a new line of drycleaning equipment, as well as the control and manufacture of 5000 parts to be used in the assembly of the various drycleaning machines.

New A-C Distributor . . . Moore Bros. Electric Co., 2602 Leith Street, Flint, has been appointed a distributor for Allis-Chalmers motors, controls, transformers, and "Texrope" V-belt drive equipment in Genesee, Lapeer, Shiawassee, Oakland, Saginaw, and Tuscola Counties, Michigan. The company has also been named a certified service shop for Allis-Chalmers motors in the same areas.

New Expansion Program . . . Atlantic Steel Company, Atlanta, has completed details for a new office building to be erected on the Company's property at Sixteenth and Mecaslin Streets. The project, part of a $10 million expansion program, will provide space for the company's executive offices, sales department, fabricating engineering, purchasing, advertising, bookkeeping and electronics records section.

First with NEW "Automatic" Service

Cone was the first builder of multiple spindle automatics to provide machine users with an experimental service in the application of carbide tools.

This service is a practical means of determining the possibilities of carbide tools for production men without loss or interference with their regular production schedules.

A pamphlet "FOUR STEPS WITH CONE" describes this service. Send for your free copy.

Conomatic

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CHICAGO, ILL.
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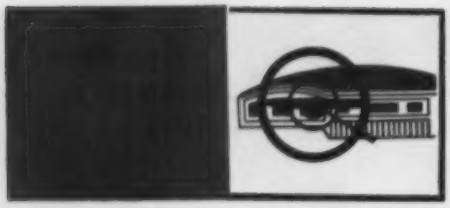
CONE AUTOMATIC MACHINE COMPANY, INC., WINDSOR, VT., U.S.A.



Public Wants More Creature Comforts

Automatic transmission, power brakes, air conditioning are new car features in growing demand . . . Spell out greater driving ease, comfort, safety . . . Air conditioning sales up—By T. L. Carry.

◆ PUBLIC ACCEPTANCE of creature comforts in new automobiles is becoming more and more pronounced as times goes on.

Take, for example, the case of automatic transmissions. A man whose car was so equipped back in the 1940s was an outstanding exception rather than the rule. Today, demand has grown so great that automatic shifts are now practically considered standard equipment for cars.

The same is true of power assist features that have been gradually added to autos since 1950.

Power steering, the first of such attachments to be introduced, has grown so much in popularity that one automaker, Oldsmobile, reports this feature is now ordered as optional equipment on 58 pct of its cars.

Safety Factor . . . The reason for the demand is obvious to anyone who has ever driven a car with power steering. Ease of handling not only reduces fatigue on long trips but is also a safety factor when the matter of control on rough and widening roads is considered.

The increase in the use of power brakes has also grown in a like manner. They were installed on 68 pct of all the cars produced at Oldsmobile during the first 6 months of this year. Whether a safety factor is involved is still a moot question. But there is no doubt that less effort is required when applying the brakes. A car equipped with power brakes can be halted almost by the mere touch of your toes on the pedal.

Seats and windows that can be lowered and raised by pushing buttons are not so much in demand this year. But these are relative newcomers in the power assist field and the demand is expected to increase as the public becomes more accustomed to the innovation.

Hot Weather Note . . . Air conditioning is entirely another matter. Sales throughout the industry have more than doubled since last year. The increase has been noted despite the fact that the cost of individual units runs from $400 to $600.

The sudden spurt in sales is partly accounted for by the fact that the units are available for the first time this year on the industry's main line of low priced cars, Ford, Chevrolet and Plymouth. In addition many improvements have been made since auto air conditioning was first introduced.

Most units are now contained in the engine compartment, thus eliminating the need for air ducts running the length of the car. The equipment no longer clutters up the trunk, robbing the motorist of valuable storage space. Combined units that heat in winter and cool in summer have also stimulated demand.

The main reason for the increased sales is the comfort that air conditioning provides. Personal experience with an air conditioned Hudson Rambler during the recent prolonged heat wave has convinced us that there is nothing like it—even if you can't afford it. An even temperature in the low 70s can be maintained inside the car even if the outside temperature soars high into the 90s.

The market for air conditioning is especially good in the south and southwest and the industry expects it to get even better as more improvements are added.

"Whoa darn it, whoa!"

Ford Boosts Dearborn Capacity . . . Ford Motor Co. is increasing its capacity for Ford cars at the Dearborn assembly plant. Operations there will be placed on a 2-shift basis beginning next September.

Capacity under present conditions is 600 cars a day. With the added shift, Ford hopes to boost its output to 1040 units. Reason for increasing production is the increased demand for Fords in the Detroit market area which includes dealers in Michigan, Ohio and Indiana.

for transportation equipment

that stands up...

FLAT-ROLLED STEEL

produced by a specialist

The kids who roll down Oak Hill in a coaster wagon, and those of us who ride in the world's best automobiles, put a lot of faith in flat-rolled steel.

If you use flat-rolled steel in your products, rely on a specialist—Great Lakes Steel. Our entire organization is devoted to the business of making more and better flat-rolled steel for every application. Many manufacturers have found we have some unique qualifications to help them to improve products and reduce costs. We would like the opportunity to work with you on your problems.

Call on our 25 years of specialization in flat-rolled products. Our representative will be glad to discuss your particular needs at your request.

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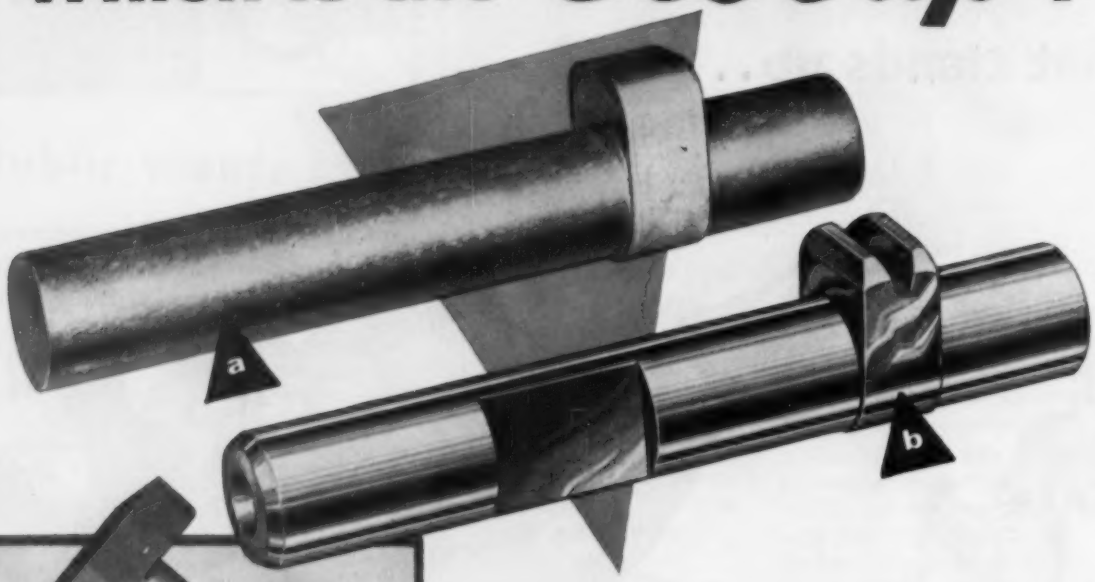
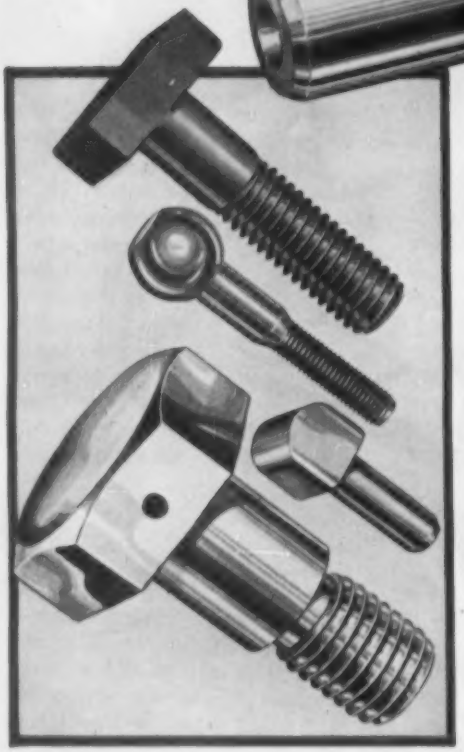
PRODUCER OF NAX HIGH-TENSILE STEELS

SALES OFFICES IN CHICAGO, CLEVELAND, GRAND RAPIDS, INDIANAPOLIS, LANSING, NEW YORK AND PHILADELPHIA

Which is the CleCap?





...it could be both _____ made by fast economical CleCap processes

It just might pay you to take a good look at the special parts you're buying that could be made more economically by CleCap's hot heading or cold extrusion processes. Quite a number of our customers have done it... and they like what happened.

The forged blank (a) above was produced for one user. He finished it as it's shown at (b). CleCap pre-forms your non-standard parts for further shaping and machining in your plant or manufactures them complete, ready for your assembly line. You'd be surprised at all the different shapes we've turned out.

You can save yourself tooling and machine time. Take a look at what CleCap offers—engineering skill and experience in applying high production methods and machines to your problems. Anyway, write for folder, "Specials by Specialists".

Cleveland *Top Quality* Fasteners

FERROUS AND NON-FERROUS

Hexagon Head Cap Screws • Socket Head Cap Screws—Plain & Knurled; also Flat and Button • Flat Head and Fillister Head Cap Screws • Place Bolts • Structural Bolts • Tractor Bolts • Square Head Set Screws • Socket Set Screws • Milled Studs

The Cleveland Cap Screw Co.

2929 EAST 79th STREET • CLEVELAND 4, OHIO

VUlcan 3-3700 TWX CV42

Originators of the Kaufman DOUBLE EXTRUSION Process

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
July 30, 1955	172,176*	28,737*
July 23, 1955	178,784	29,629
July 31, 1954	110,266	20,257
July 24, 1954	111,639	19,114

*Estimated Source: *Ward's Reports*

The company could not run two shifts at the plant before because part of the facilities were used for producing station wagon bodies. Expansion in other parts of the country is eliminating the need at Dearborn for station wagon body production and is releasing space for conversion to two shifts.

Only one other Ford assembly plant in the country is presently operated on a two-shift basis. It is located at Dallas, Tex.

Sales:

Factory truck, auto figures hit 6-month high.

Factory sales of cars and trucks for the first 6 mos. of this year set an all-time record, according to figures recently released by the Automobile Manufacturers Assn.

Total sales amounted to 4,863,333 units including 4,226,729 cars, 634,772 trucks and 1832 buses.

The previous record for the first 6 mos. of any year was set in 1951 when factories sold 3,889,867 vehicles.

Factory sales of 8,003,056 units in 1950 represent the industry's best full year so far. But if the first half of 1955 is any indication, that figure is going to be passed this year.

New records are being set every month. General Motors Corp. says that all of its divisions reported record sales for the first 20 days of July both in new and used cars.

The corporation's new car sales for the period totalled 187,799 units. This was 137.1 pct better than sales for the same period last year.

Sales figures from other companies in the industry are not immediately available. But the records are going to topple this year. Early estimates of 6½ million cars being made were discarded long ago. Now the industry is talking in terms of 8 million cars alone. Production of trucks and buses is likely to push the total well over the 8.5 million mark.

Independents Gain

The struggle of the Independent automakers for a bigger share of the market has been watched with special interest this year since the mergers of Studebaker-Packard and Hudson and Nash into American Motors Corp.

American Motors realized a net profit of $1,592,307 in the quarter ended June 30. It was the first quarterly profit reported since the merger of Hudson and Nash in 1954. The profit compared to a net loss of $3,848,667 for the corresponding period a year ago.

George Romney, American's president, said the company has been operating in the black 4 mos. —March, April, May and June.

The earnings, according to Mr. Romney, helped to offset losses incurred in the first 5 mos. of the current fiscal year when manufacturing programs were being consolidated at a very high cost.

The new corporation is not yet out of the woods, however. Net loss for the 9-month period ending June 30 was $4,522,171 after a tax recovery of $4,723,000.

Show Sun Model

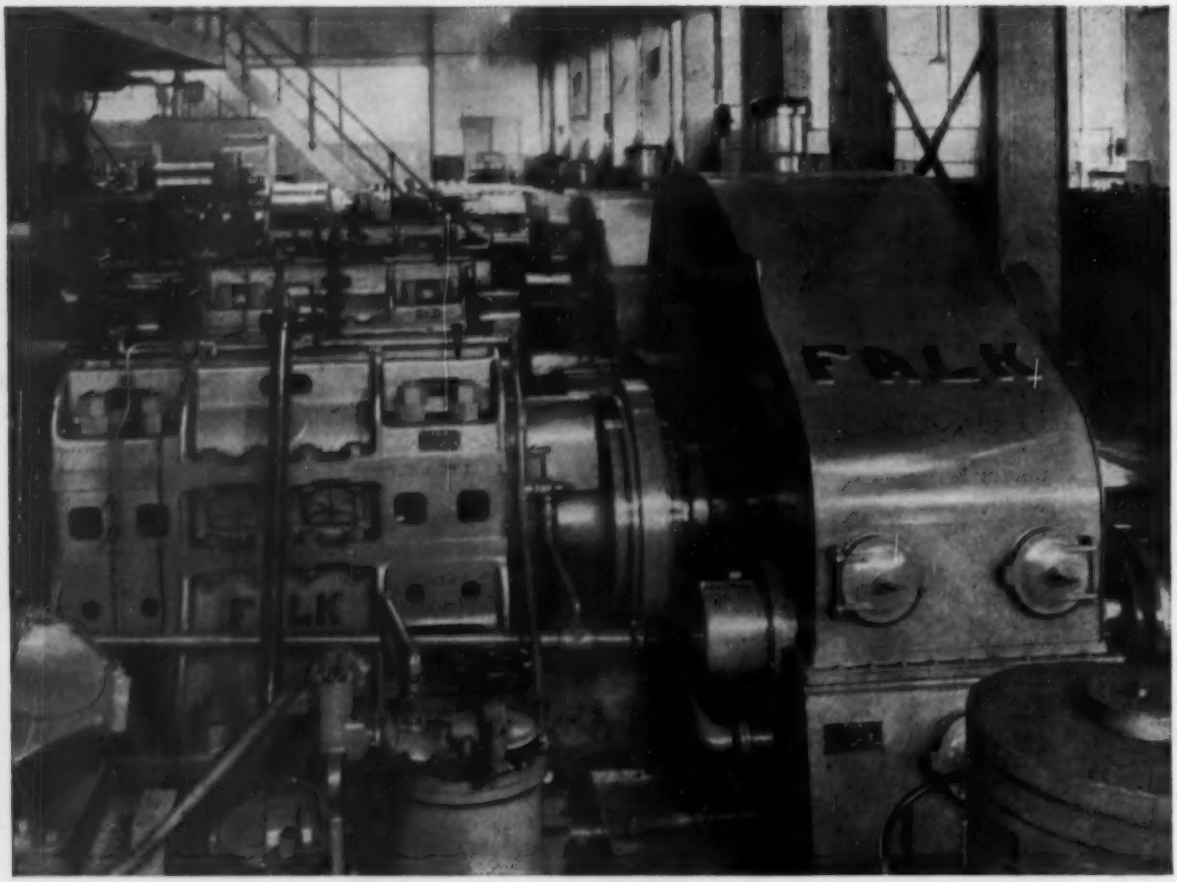
Visitors to General Motors Powerama in Chicago during August and September will get a glimpse of a possible power source of the future when a sun-powered model automobile is exhibited there.

The 15 in. car, called the "sunmobile" has 12 photoelectric cells which convert light into electricity. The current powers a tiny electric motor which propels the car.

The photoelectric cells are made of selenium, which converts light into electric power.

The "sunmobile" is part of a Power for Progress demonstration. Electric lamps will simulate sunlight and supply power to the tiny car.

THE BULL OF THE WOODS By J. R. Williams



"Inside Story" of Better Gear Protection—

EXTREME pressures generated in enclosed reduction gear drives and pinion stands call for a lubricant with high EP characteristics — *Texaco Meropa Lubricant.* The EP properties of this fine oil stand up through the severest service, assure smoother, quieter operation, full protection and longer life for gears and bearings... lower maintenance costs.

Texaco Meropa Lubricant is especially resistant to oxidation and thickening. It does not foam... does not separate in service, storage or centrifuging... protects bearings from corrosion.

A Texaco Lubrication Engineer will gladly give you full information. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO

TEXACO Meropa Lubricants

FOR STEEL MILL GEAR DRIVES

TUNE IN . . . TEXACO STAR THEATER starring JIMMY DURANTE or DONALD O'CONNOR on television . . . Saturday nights, NBC.

Is Ohio Prime Atom Bomb Target?

Civil defense planners worry about state's thick population, plant concentration . . . Big steel center exposed . . . Seek special inquiry into evacuation, survivor care—By G. H. Baker.

• BUSY, industrious northeastern Ohio is rated as a trouble spot on civil-defense planning maps.

The reason: About 3 million people live and work in the tight triangle formed by Cleveland, Akron, and Youngstown. An atom bomb dropped anywhere in that area would not only destroy tremendous steel-making and machinery-producing capacity, but would also present a nightmare of an evacuation problem.

Cleveland, Akron, and Youngstown are among the nation's 92 "critical target areas."

Problem is serious enough, in the opinion of civil defense bosses, to rate a special government inquiry during the next few weeks.

What they want to find out: (1) What are the best and fastest evacuation routes leading out of northeastern Ohio; (2) Can the area feed, shelter, and clothe its survivors and evacuees? There may be tens of thousands of survivors, it is estimated.

Study Aluminum Needs . . . A government decision is near on whether or not to order another round of expansion in aluminum capacity. Defense Mobilizer Arthur S. Flemming has been quietly gathering pro-and-con arguments from federal defense officials as well as from aluminum users.

So far, he's inclined to believe the government has a defense obligation to support a so-called "third round" of expansion, despite claims that the current shortage is only temporary.

Unkink Fighter . . . Now that the engineering kinks are getting worked out of late-model planes like the F-101 Voodoo fighter, the Air Force is cautiously predicting that its overall goal of 137 wings in the next 2 years may be reached ahead of schedule.

Air Force procurement officers won't say so officially, but they hint that some of the advanced models now in production are ready to roll as far as factory output is concerned. As soon as the Pentagon receives assurances from the field that no further changes or modifications will be required, it is prepared to tell plane factories to "roll 'em."

Subcontractors as well as prime contractors will be affected by the forthcoming speed-up moves. Procurement officers promise the speed-up won't work undue hardship on factories, but some suppliers may feel a short-run pinch as the assembly lines begin to hum a little faster.

Production of B-52 heavy jet bombers was ordered stepped up by about 35 pct recently. The Pentagon says it hears few squawks from contractors over the speed-up.

May Charge Landlord . . . Cities losing tax revenue because the federal government has become the non-taxable landlord of defense plants within their boundaries may get a helping hand from Congress next year.

Under the terms of legislation pending in the House, the federal government will reimburse municipalities for revenue lost when privately-owned (and taxable) properties are bought by an agency of the federal government (nontaxable).

Ike Backs Measure . . . Such legislation has the backing of President Eisenhower's Commission on Intergovernmental Relations. Rep. Torbert H. Macdonald, D., Mass.,

Mind You Really Mine

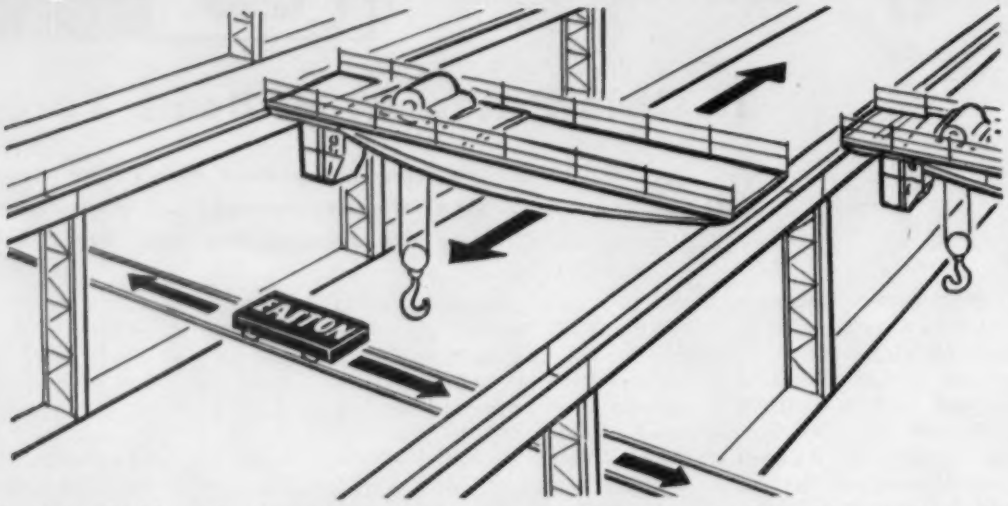
If you're going to file a mining claim on any government land, be sure you intend to stick to mining.

"Miners" who file claims but whose real intent and purpose is to operate motels, shooting lodges, logging camps, or grazing sites are now likely to run afoul of the law. President Eisenhower has signed into law new legislation making it illegal to stake out mining claims for any purpose other than bonafide prospecting for and extraction of metals and minerals.

The new law is expected to stop the flood of federal mining claims from "operators" who abandon their "mining" operations after turning over a shovelful of earth and who then commence a commercial or non-mining enterprise on the site.

USE YOUR IMAGINATION WITH

Cross-Bay® Transfer Cars



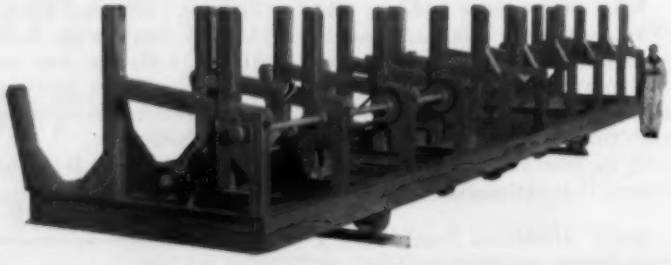
Infinitely variable application of EASTON motor-driven Cross-Bay Cars, together with the possibility of special super-structure design, provides full scope for imaginative planning in this growing era of automatic handling.

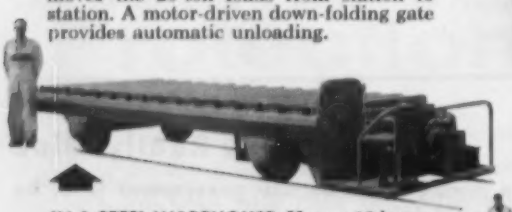
EASTON Cross-Bay Transfer Cars were originally introduced to supplement overhead crane service in modern parallel bay plants and for movement of materials between plant buildings, storage yards and shipping platforms. Operating men everywhere were quick to see the adaptability of the Cross-Bay idea to many other heavy handling and production problems.

EASTON Cross-Bay Cars, controls and special superstructures are custom-designed to meet individual requirements. Customers may specify electric motor, storage battery, gasoline-electric or gasoline-hydraulic power. Controls may be manual, electric (by push-button on the car or remote station) or electronic. EASTON Cross-Bay Cars can be built to capacities from 5 to 500 tons to fit any track gauge.

Investigate the EASTON Cross-Bay idea now for plant expansion and new plant programs.

IN A TUBE MILL. An interesting application of mechanized superstructure. Here several lengths of brass tubing are carried in a special superstructure on an EASTON Cross-Bay Car. The 2 horsepower electro-fluid drive, controlled from a walk-along push-button station on the side of the car, moves the 20-ton loads from station to station. A motor-driven down-folding gate provides automatic unloading.





IN A STEEL WAREHOUSE. Here a 12 horsepower gasoline-hydraulic EASTON Cross-Bay Car handles 25 ton loads of structural shapes in a steel warehouse. A comfortably seated driver operates the car at speeds up to 50 ft. per minute forward or reverse between plant buildings.

IN A STEEL MILL. Here a push-button control panel is attached by a 10 ft. cable to a 100-ton capacity 3 horsepower electro-fluid EASTON Cross-Bay Car. As the operator walks along the car follows carrying two 50 ton slabs of steel.

A-1047

OTHER EASTON CUSTOM-BUILT CARS FOR INDUSTRY

Annealing Furnace Cars	Motor Driven Cars	Scoop Cars
Coal Charging Cars	Newsprint Cars	Skip Cars
Core Oven Cars	Platform Cars	Steel Mill Cars
Gable Bottom Cars	Quarry Cars	Transfer Cars
Hopper Cars	Rack Cars	Transformer Cars
Mine Cars	Rocker Dump Cars	Turntables

FORTY-ONE YEARS OF DEPENDABLE SERVICE IN THE DESIGN AND MANUFACTURE OF INDUSTRIAL TRANSPORTATION EQUIPMENT

EASTON

EASTON CAR & CONSTRUCTION COMPANY • EASTON, PA.

is sponsoring a bill in the House of Representatives to subsidize the city treasuries. As an example of what's happening, he cites the case of Everett, Mass., which has been losing nearly $100,000 a year in taxes since the Air Force took over the General Electric plant there.

About 60 industrial properties, located in 20 states, would have sums in lieu of their normal taxes paid into their respective city treasuries by the federal government, under the Macdonald bill.

Congressional leaders are only mildly impressed with the plight of cities in this nonelection year. Next year will spell a different story.

Bar Exclusive Ties

Economic necessity does not justify exclusive dealing policies, according to an initial decision by a Federal Trade Commission hearing examiner against the Outboard, Marine & Manufacturing Co., Waukegan, Ill., manufacturers of Johnson Sea Horse, Evinrude and Buccaneer outboard motors.

FTC had charged that the firm's exclusive dealing contracts with retailers lessened competition and tended to create a monopoly because of the dominant position in the outboard market.

The examiner ruled that such contracts have foreclosed competing manufacturers from "a substantial segment of the best marketing outlets," and curtailed the business potential of dealers selling the firm's products by depriving them of unlimited choice of brands.

How to Make and Sell

Hints on developing and selling new products, backed up by experience of manufacturing firms, are contained in a new government publication now available to industry.

The booklet, recently revised by the Commerce Dept. and the Small Business Administration, describes experiences of firms which have successfully developed and marketed new products, and gives hints on how firms of any size can initiate and carry out new products programs.

Included are hints on locating ideas for new products, with a list of major idea sources; selecting the right product; getting it ready for market; naming and packaging; planning a marketing program, and government aids to new products development and marketing.

Titanium:

Over half of record output went into aircraft.

New Business and Defense Services Administration figures indicate that the higher output of titanium mill products is especially valuable to the aircraft industry.

Second-quarter output of these items hit an all-time quarterly high of 941,602 lb, of which 494,507 lb was in the form of billets, rod, bar, and wire, needed for manufacture of aircraft engines. The full production for the quarter was 144,383 lb higher than the first quarter.

All Added Up

During the April-June period, output of rod, bar, and wire amounted to 207,754 lb as compared with 115,731 lb in the first quarter. Forging and extrusion billet production totaled 286,753 lb, as against 221,124 lb in the opening quarter this year.

Output, of sheet, plate, and strip, plus a small amount of titanium for pipe, tubing, and extrusions, added up to 447,095 lb. First quarter production of these items totaled 460,364 lb.

Distribution of the second-quarter supply of mill products included 920,942 lb for defense-rated orders and 20,660 lb for unrated orders. In the first quarter, 777,323 lb were earmarked for rated orders and 19,896 lb for unrated orders.

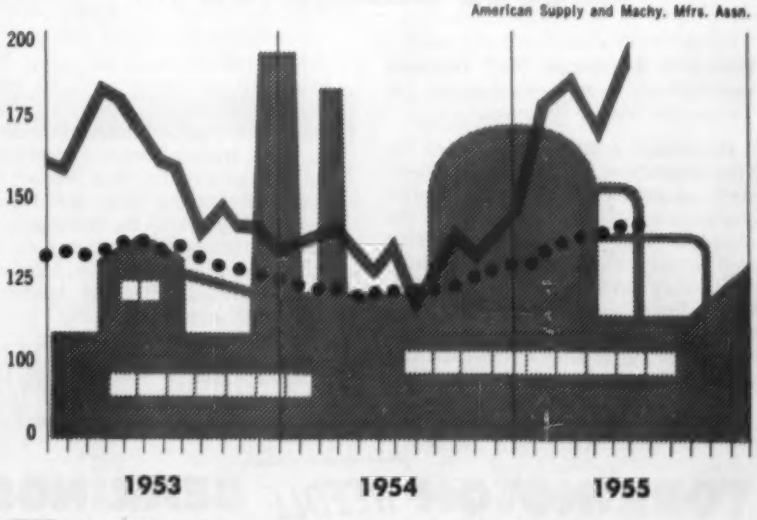
Materials Research

Air Force research in various materials fields is available in a new publication of the Office of Technical Services, U. S. Commerce Dept.

"Review of the Air Force Materials Research and Development Program" (PB 111648) contains abstracts of 130 reports of studies performed in fiscal 1954. Included is information on work in metallurgy, textiles, petroleum products, structural materials, rubber, plastics, and protective treatments.

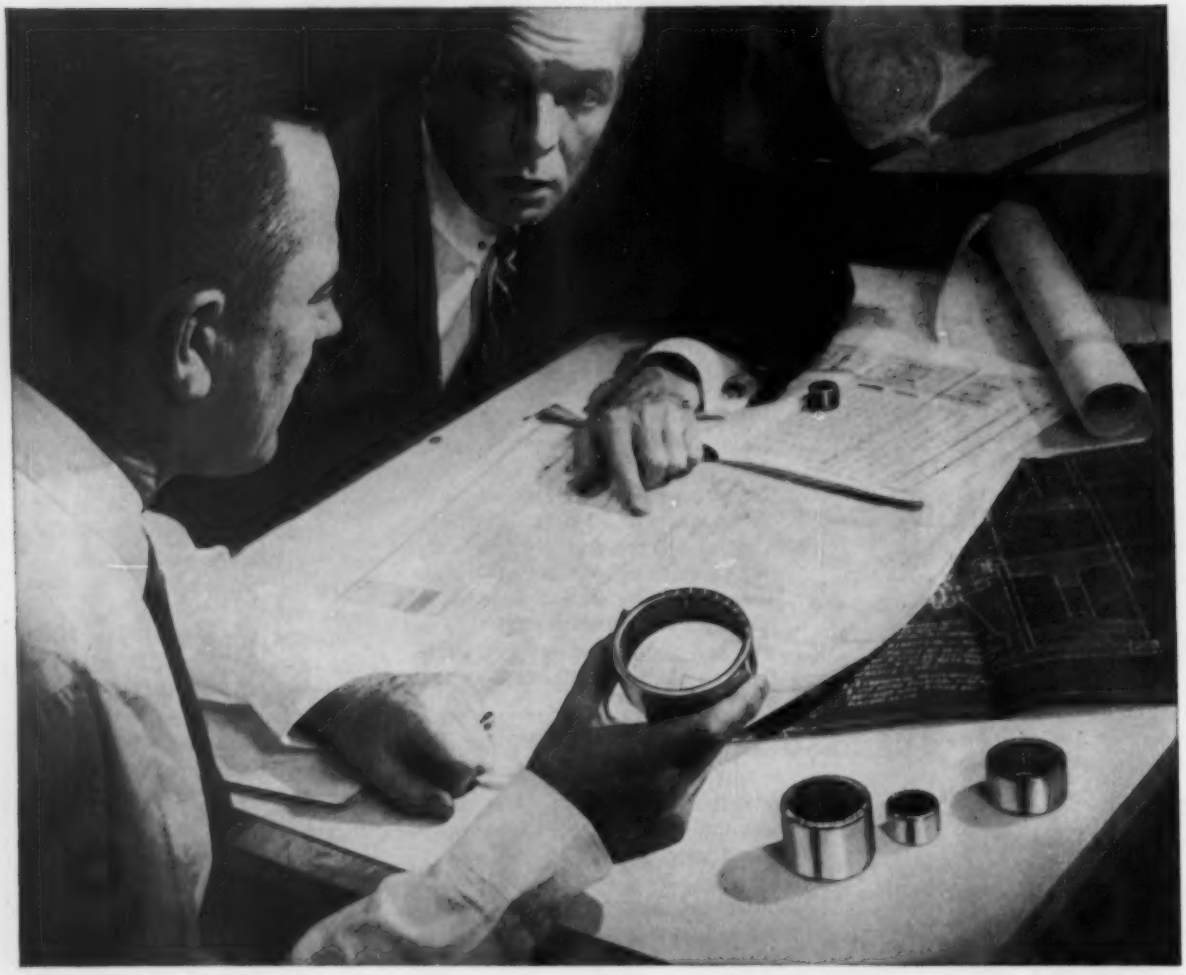
The 105-page report supplements a larger report, covering the previous 10 years of Air Force materials research, released by OTS in April. Price of the supplement is $2.75.

American Supply and Machy. Mfrs. Assn.



New Order Index Industrial Supplies and Machinery July 1948=100

●●● Federal Reserve Industrial Production Index 1947-1949 Average=100



His wide experience with **TORRINGTON NEEDLE BEARINGS** may solve *your* problem

Here is a Torrington Staff Engineer working on a new application for Torrington Needle Bearings.

He's made a thorough study of the field report from the District Engineer. He's consulted the files for similar applications—files which comprise the complete history of Needle Bearing applications to date. He's talked with—and may even have worked with—the customer's own design staff. Now he's back at his board with the Chief Bearing Engineer after he has carefully analyzed speeds, loads and deflections.

This product could be yours. The unmatched experience in Needle Bearing applications of our Engineering Department can be brought to bear on your anti-friction bearing problems. And you can gain for your product the unique advantages that the Needle Bearing has given to thousands of products throughout industry in the past twenty years. Let us help you make the Needle Bearing "standard equipment" in your product.

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Torrington, Conn. • South Bend 21, Ind.

These features make the **TORRINGTON NEEDLE BEARING** *unique*

- low coefficient of starting and running friction
- full complement of rollers
- unequalled radial load capacity
- low unit cost
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- compactness and light weight
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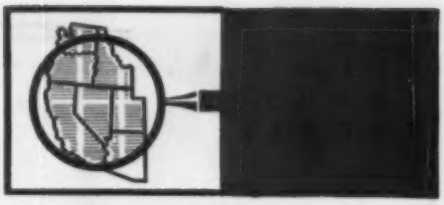


East Boom Killing West Shipyards

California yards operating at only 5 pct capacity . . . employment less than 1 pct of World War II level . . . Governor seeks "share" of Federal contracts as key to revitalization—By R. R. Kay.

◆ PRIVATE West Coast shipyards are going to seed. East Coast yards are grabbing off the big bulk of government contracts.

If things don't get better—and pretty fast—there won't be any private shipyards left here.

California yards alone are operating at only 5 pct of capacity. Example: Los Angeles shipbuilding employment is down from World War II's 120,000 to a sorry 1658.

West Coast yards are near-dead vs full blast activity at Baltimore and Newport News, Va. And shipbuilders here are plenty irked.

California's fighting to keep its yards alive. Governor Knight's 18-man committee is trying to get a "fair share" of the $2.3-billion Federal shipbuilding and repair budget for 1955-56. They're shooting for $200 million in contracts to bring the yards back to life.

West Coast shipyards depend on government contracts. Why? Shrinking coastwise shipping, and growing favor for foreign-built vessels. One large oil company ordered two tankers built in Japan and two in France.

Aluminum vs steel . . . Will aluminum make serious inroads into line pipe business?

Kaiser Aluminum & Chemical Corp., Oakland, Calif., says its new aluminum line pipe for oil field use is: (1) cheaper, (2) weighs about one-tenth as much, (3) takes one-sixth the time to install.

Pipe comes in 2, 3, and 4 in. diameters. It's roll-formed and welded from high-strength aluminum sheet. Inside and outside surfaces are clad with a special aluminum alloy to increase corrosion resistance.

Kaiser claims its aluminum pipe is easily flanged at ends by power machinery or hand tools—can be done in the field; needs no welding of couplers; is fast and simple to install; is lightweight—30-ft length, 4-in. diam weighs 31½ lb; is corrosion resistant, flexible at joints; and its smoother inside surface cuts down friction and turbulence. Recommended operating pressure: 500 psi.

Cast aluminum couplers allow greater flexibility than welded or fixed couplers. A 90-degree turn is possible in four 30-ft lengths without elbows, Kaiser engineers say.

Other possible oil field uses for aluminum pipe: secondary recovery by salt water injection; salt water disposal; low-pressure flow lines and gathering systems.

"That was delicious. What else can you cook besides salami?"

Steel pipe expands . . . But here's one company not scared off by aluminum pipe competition. A new $6-million steel pipe plant opened at Port Moody (Vancouver), British Columbia. And the owner, Canadian Western Pipe Mills, Ltd., subsidiary of Rheinrohr Organization, West Germany, is going ahead with a second $6-million unit.

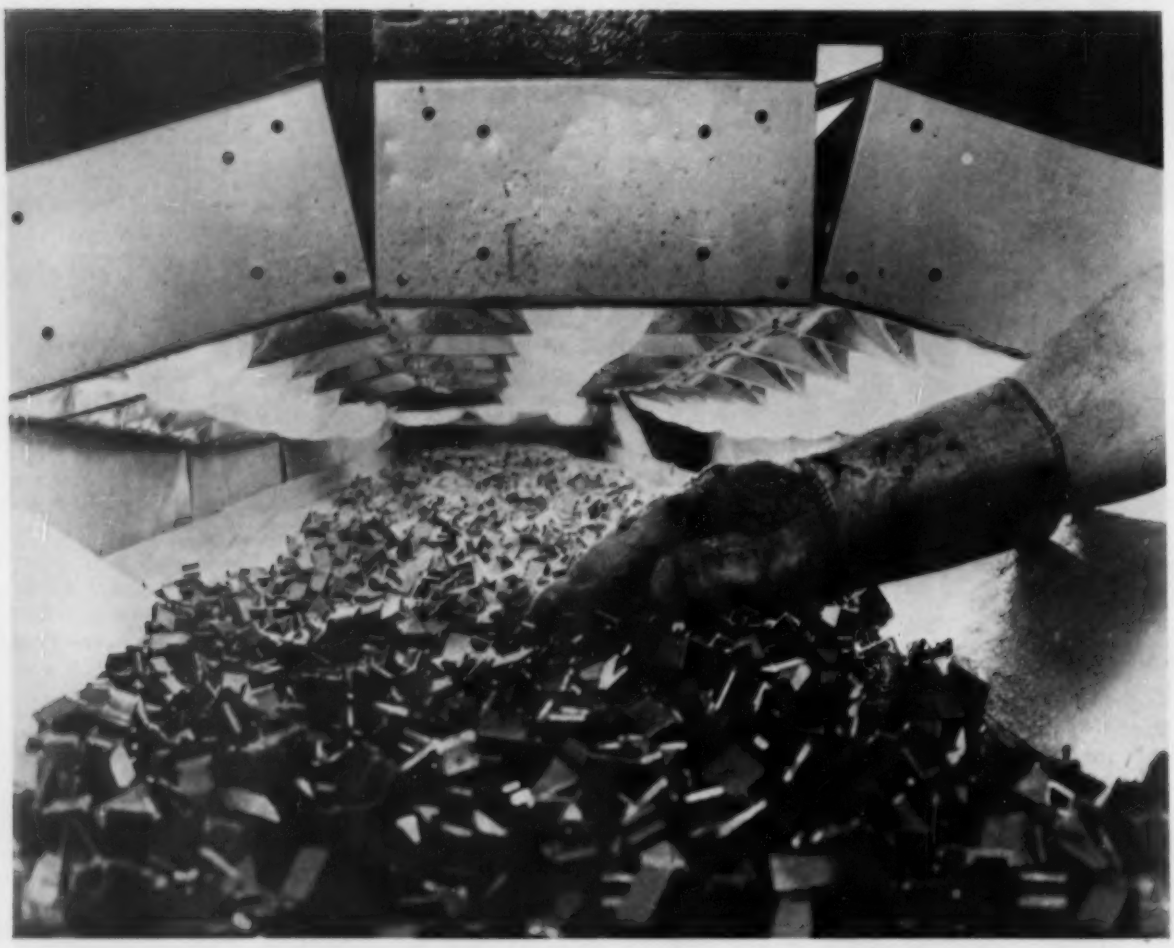
60,000-Ton Capacity

The new 145,000-sq-ft plant has an annual capacity of 60,000 tons black and galvanized pipe, ½ in. to 4½ in. Will also make: electrical conduit, furniture and mechanical tubing. The proposed second plant will most likely make a full range of larger-diameter pipe.

Grow! Grow! Grow! . . . Metalworking companies keep on landing and expanding in the West. Here are the latest, ranging from makers of aluminum kneeling benches for churches to steel and pipe fabricators.

Byron Jackson Co. will build a $1.5-million Santa Ana, Calif., plant for production of electronic equipment . . . Douglas Aircraft Co., Inc., Santa Monica, Calif., plans a new plant to make its DC-8 jet airliner. . . . Tricraft Welding Co. expanded its South Gate, Calif., steel and pipe fabricating facilities.

Hamlin Manufacturing Co., producers of aluminum kneeling benches for churches, is expanding at Glendale, Calif. . . . National Cash Register Co. bought a 20-acre Hawthorne, Calif., site for an engineering and research building.



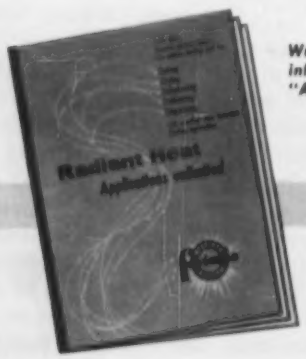
How to make short work of a long finishing job

Fast? A Fostoria Radiant Oven heats at the speed of light . . . requires no warm-up . . . bakes out a finish in a fraction of the time required by convection ovens.

You save space—cut costs to the nub—improve product quality. Read the Tinnerman case history at the right.

- **Cuts drying time 74%**
- **Tinnerman Products, Inc. makes fasteners --by the millions.**
- **Before Fostoria was called in, parts were finished in two fuel-fired batch ovens with great waste in time and motion.**
- **Two Fostoria Radiant Ovens cut drying time from 30 to 8 minutes—freed one worker for other tasks—improved work conditions.**

Savings like this may be possible in your operation. Call your Fostoria Sales Engineer for the complete story. There is no obligation!



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MACHINE TOOL HIGH SPOTS

How About More Machine Tool Shows?

Some builders would like to see annual exhibits . . . Development pace and cost are objections . . . Show budgets for small companies approach $50,000 . . . Shipping, handling costly—*By E. J. Egan, Jr.*

◆ SOME METALWORKING manufacturers would like to see a Machine Tool Show every year. Could be they don't realize the money, time and effort required to put on a display like the one coming up in Chicago, Sept. 6 through 17.

For one thing, there's the item of the cost to each machine tool builder. Show budgets for even the smaller firms aren't likely to be under $50,000; the larger companies may very well appropriate $300,000 to $400,000 for this big affair.

The typical builder's Show budget includes such items as display space charges, equipment transportation and installation costs, and naturally, a hefty provision for incidental expenses.

The latter sum must take care of transportation, hotel and restaurant bills for the builder's own executive, sales and demonstrator personnel. And most of these company personnel will probably need a bit of extra cash to see that likely machine tool prospects don't suffer too terribly from hunger or thirst.

Sell Demonstrators . . . Cost of the equipment on display doesn't usually figure into the builder's Show budget, either. Assumption is that these machine tools aren't super-duper demonstration novelties. They may have an extra coat of polish, but they will eventually be sold at list price, just as will the duplicate models coming off the line back at the home plant.

The time element is heavily against holding an annual Show, too. For the machine tool industry at large, startling, show-worthy innovations just aren't developed that quickly. Even if they were, the sheer physical task of shipping and setting up hundreds of precision machine units would be almost too much.

Cars Roll . . . Show officials estimate that by opening day, at least 300 railroad cars and 1000 trucks will have been used to bring the full array of machine tools to Chicago's south side. And of the total equipment items to be displayed, some 523 are of a size and shape to require more than ordinarily skilled handling.

Consider just one mechanical press that was recently installed at the International Amphitheater site. It weighed over 108 tons but it was speedily set up without the use of overhead cranes—usually standard equipment in the average industrial plant. To offset this lack, rigging crews are using railroad cranes and A frames.

To handle such big machines, skilled riggers are being recruited from Chicago, Cleveland, Detroit and other industrial centers. Their handling chores were planned far in advance to mesh with rigid shipping and delivery schedules assigned to each builder.

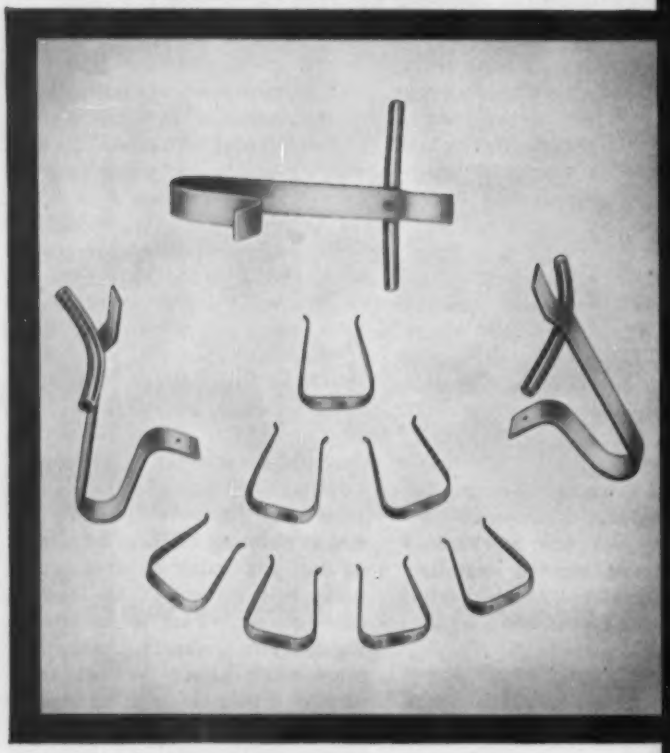
Avoid Painting In . . . The overall machine installation plan is something like the well known system of painting the floor of a room so that you finish up at a convenient exit instead of an inescapable corner. The huge broaching machines, shears, brakes and presses are being moved into their display areas in a step-by-step arrangement. This permits the orderly withdrawal of handling equipment as each tool moves into place.

Visitors might expect that some of the larger machine tools will tower far above convenient viewing levels. To bring some of this giant equipment "down to earth," a number of concrete-lined pits have been prepared. Work areas on these pit-mounted machines will be at eye level for passersby.

For certain other large machines where pit-mounting is not feasible, elevated platforms will be erected so that spectators can get a close-up look at operations from several vantage points. All of which points up that the Machine Tool Show is like no other industrial event in size and problems.

"José, I get the impression somehow that you don't like me."

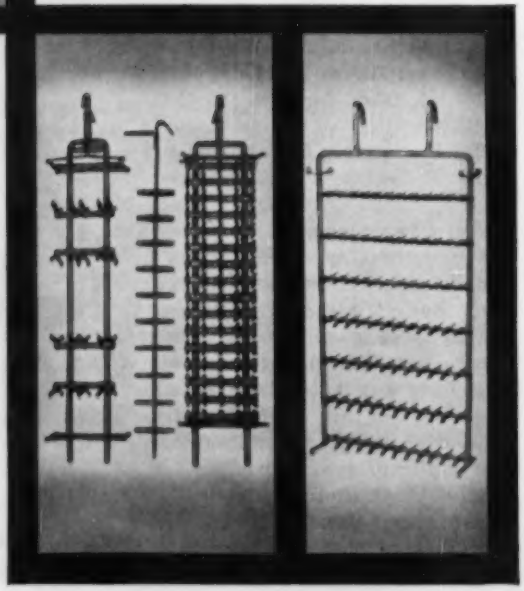
Spring quality of
REVERE
PHOSPHOR BRONZE
—important to Higgins Rack



When small parts have to be plated, the problem arises as to how to hold them on the plating racks. If they are not heavy enough to hang by their own weight, spring clips must be used. For such clips, the Higgins Rack Coating Mfg. Co., Hazel Park, Mich., uses spring temper Revere Phosphor Bronze Strip. This material is specified because its spring temper gives it the ability to withstand repeated flexing, so that the clips can be used repeatedly, and that small parts can be snapped in and out of them quickly and without distortion.

The racks to which these clips are attached are made of copper bar; the clips are fastened by riveting and soldering. Everything except the contact points of the clips is coated to prevent deposition of the plating metal and loss of current. Higgins is an important supplier of these special racks to the automotive industry, which uses them to plate both interior and exterior trim. The efficiency and economy of this method helps make handsomer cars and trucks as well as numerous other attractive consumer commodities.

Clips and racks made to special designs by the Higgins Rack Coating Mfg. Co., which buys Revere Phosphor Bronze Strip for the clips from Copper and Brass Sales, Inc., a Revere Distributor in Detroit, Mich.



REVERE

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

230 Park Avenue, New York 17, N. Y.

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Mills: Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome, N.Y. Sales Offices in Principal Cities, Distributors Everywhere.

The Iron Age

SALUTES

Hendrik de Wet Erasmus **After a period that included stays in South Africa, Germany and England, he came to America to find a permanent home and play a big role in the development of low carbon ferroalloys.**

Hendrik Erasmus was born in Sterkstrom, South Africa. He works today in Niagara Falls, N. Y. There's 7000 miles and an eventful story between the two places but steelmakers get more excited over the minute fractions Mr. Eramus has knocked off the carbon content of stainless steels.

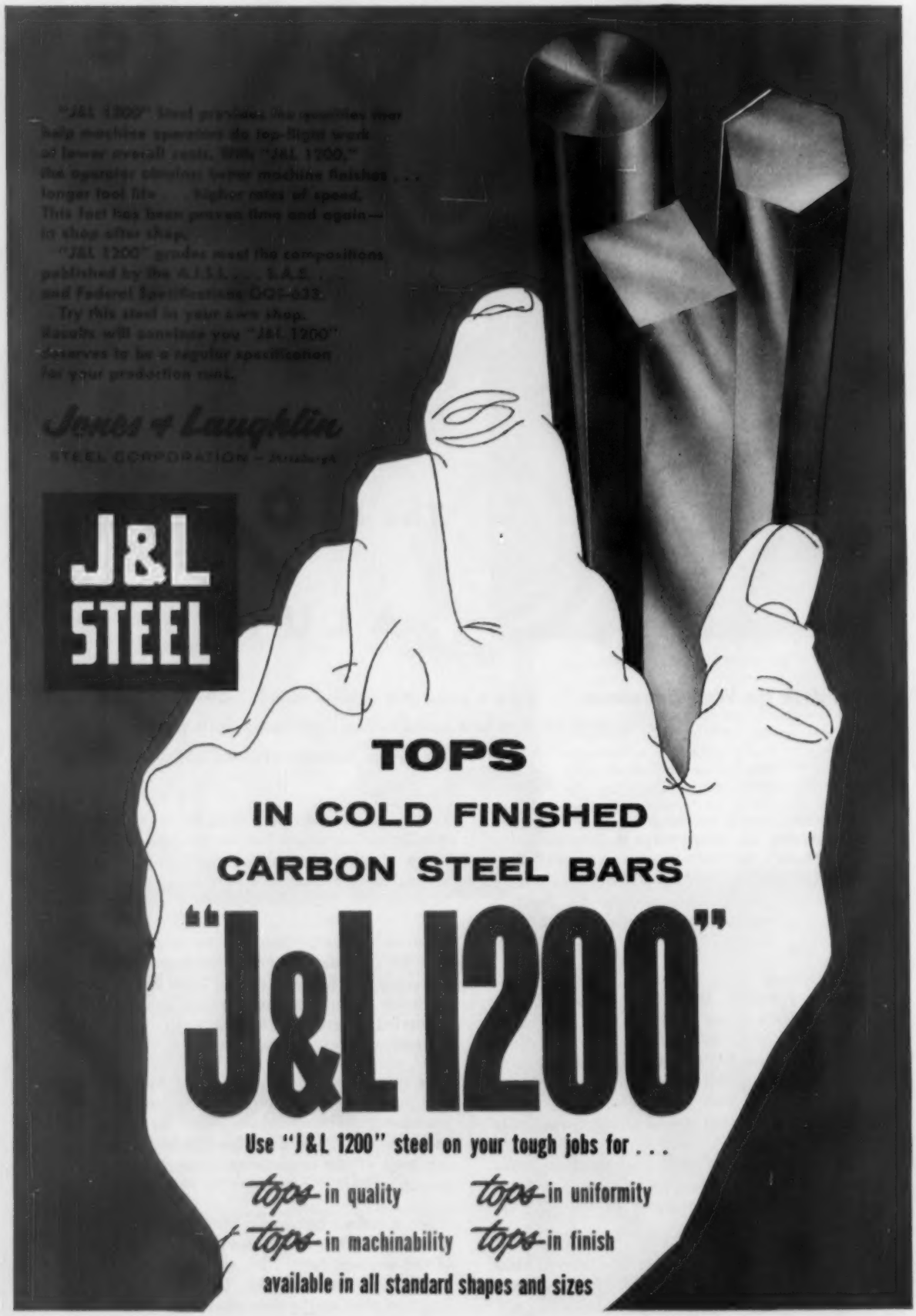
Department head of Electro Metallurgical Company's Metals Research Laboratories, he was recently honored by the American Chemical Society's western New York section for work with ferrochromium. His development of a technique for using extremely high vacuum in the separation of carbon and sulfur from other elements has resulted in iron alloys of unusually low carbon content. Since carbon content is a critical factor in the quality of many stainless grades, his achievements are of real importance to this billion dollar segment of the steel industry.

There were moments back in Sterkstrom when Hendrik Erasmus didn't appear likely to reach Niagara Falls or anywhere else. Born in 1899, just in time for the Boer War, he came through hostilities unscathed but at the age of 7 was thrown from a farm animal and lay unconscious several hours before four-footed transport could be secured to take him to a doctor.

Surviving early hazards, he began studies that led to a Master of Science degree from the University of Stellenbosch in 1919. He lectured in South African colleges 5 years, gained an engineering degree in Germany in 1928, and worked one year in England.

In 1929 he came to this country for experience and joined Union Carbide and Carbon as a research engineer in Niagara Falls. He stayed in the country and with the one company, becoming head of the department of engineering research in 1945.

Mr. Erasmus has been a member of the American Chemical Society since 1931, was treasurer of the western New York section from 1947 to 1949. He likes economics, has visited over 70 iron and steel works throughout the world.


"J&L 1200" steel provides the qualities that help machine operators do top-flight work at lower overall cost. With "J&L 1200," the operator obtains better machine finishes . . . longer tool life . . . higher rates of speed. This fact has been proven time and again—in shop after shop.
"J&L 1200" grades meet the compositions published by the A.I.S.I., S.A.E., and Federal Specifications QQS-633.
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tops in quality
tops in uniformity
tops in machinability
tops in finish
available in all standard shapes and sizes

The Iron Age INTRODUCES

Charles Walte, Jr., director of **Reynolds Metals Co.'s** Farm Institute, appointed member of the Agricultural Dept. Committee of the Chamber of Commerce.

M. H. Lieblich, appointed assistant manager of merchandising planning, Special Products Div., **Ford Motor Co.; David Wallace,** manager of marketing research; **W. B. Atchison, Jr.,** and **Richard E. Kimball,** product planning managers; **John R. Yeager,** manager of the price planning dept.; **John L. J. Johnson,** acting manager of the programming dept., and **Jerome D. Vanek,** manager of the administrative dept.

Lewis P. Favorite, appointed manager of product sales, **Aluminum Co. of America; Frederick J. Close,** manager, market development, and **W. S. McChesney,** manager of industrial sales.

Philip Ash, Richard J. Nelson and **George S. Swope** have been appointed assistant managers of the industrial relations dept., **Inland Steel Co.,** Chicago.

Samuel C. Wagner joined **Kaiser Aluminum & Chemical Sales, Inc.,** as assistant general sales manager.

Richard B. Johnson, appointed production engineer, **Superior Tubing Co.,** Norristown, Pa.

James F. Pedder, appointed Canadian sales manager for Tractor & Implement Div., **Ford Motor Co.,** and **Willis H. Guinn,** appointed controller of Ford Aircraft Engine Div., 7401 S. Cicero, Chicago, Illinois.

J. D. Deane, named executive vice-president, **General Motors Acceptance Corp.,** New York City, and **Elmer E. Hutcheson** vice-president of the corporation.

George Cameron, selected as director of engineering, **Colonial Broach & Machine Co.,** Detroit, and **Gordon Cook,** supervisor of the company's broach engineering department.

Charles W. Lee, appointed president, Consolidated Western Steel Div., **United States Steel Corp.**

James A. Willerton, chosen as advertising manager, **U. S. Steel Corp.,** Chicago, and **Arthur C. Correll,** appointed assistant district sales manager; **John V. Schwafel,** sales engineer, Construction Materials, Columbia-Geneva Div., San Francisco.

John P. McGury has been named a staff member of the **National Foundry Assn.** Mr. McGury was formerly with Kelliher, Bowen & McGury, well-known firm of industrial consultants.

CURTIS, B. HOFFMAN, named vice-president, sales department, Brush Electronics Co., Cleveland.

LAMBERT M. KASPERS, appointed plant manager, at Russell, Burdsall, & Ward Bolt and Nut Co., Coraopolis, Pa.

ROBERT J. McCOMBS, new plant manager, at Russell, Burdsall, & Ward Bolt and Nut Co., Rock Falls, Ill.

DANIEL J. YOUNGERMAN, appointed purchasing agent of the Construction Machinery Div., of Clark Equipment Co.

Industrial Noise . . . An Industrial Sound Dept. has been formed by the Newark Electric Co., Chicago, to service industrial plants, schools and institutions. It is the fourth step in Newark's expansion program.

Gets Contract . . . Dravo Corp., Pittsburgh, was awarded a contract to construct a new liquid cargo dock on the Ohio River at Ironton, O., for the Barrett Div., Allied Chemical & Dye Corp. The floating dock will be moored between sheet steel piling cells to move vertically with fluctuations of the river level.

Goff Smith, named executive vice-president, **Griffin Wheel Co.,** a subsidiary of American Steel Foundries. **Roger G. Kimber** was named manager of railway specialties sales.

E. L. Lanois, appointed general works comptroller, **Allis-Chalmers Mfg. Co.,** Milwaukee.

Walter T. Murphy, appointed assistant general sales manager, advertising sales promotion and training, **Ford Motor Co.,** Birmingham, Mich.

J. Beach Williamson, appointed sales planning manager, Special Products Div., **Ford Motor Co.,** Dearborn, Mich.; **H. A. Pries,** dealer planning manager, and **Henry G. Baker,** market and sales analysis manager.

Bernard W. Baldwin, appointed personnel director, Detroit Transmission Div. of **General Motors; R. H. Gathman,** appointed manager, new Fisher Body stamping plant, Mansfield, Ohio.

C. T. Pearce of Westinghouse named vice-president of **American Institute of Electrical Engineers.**

GEORGE DOLAN, chosen as manager of Pacific coast region of Kennametal, Inc., Latrobe, Pa.

WALTER J. BEMB, was elected vice-president in charge of customer relations at Aluminum Industries, Inc., Cincinnati.

FRANCIS G. KREDEL, appointed chairman of bar mill committee at Republic Steel Corp., Cleveland.

SIDNEY G. YOUNG, appointed sales manager, Lewis Rolls Dept., The Blaw-Knox Co.

Olympic FM

DIE STEEL . . . used on

Roto-Flo Spline Rollers

SAE 1040 splines being cold formed.
Photo courtesy Michigan Tool Co.

Michigan Tool Co., Detroit, selected

Olympic FM for this severe cold forming application

On the new Roto-Flo Spline Rollers manufactured by the Michigan Tool Company, Latrobe's Olympic FM Die Steel has been specified for use in the cold forming racks shown above. This is a severe application involving heavy pressure to cold-form steel splines, serrations and similar shapes . . . an application that demands up to 150,000 production pieces before the racks are removed for regrinding.

Olympic FM . . . one of Latrobe's new free-machining high carbon-high chromium die steels . . . has proved extremely successful on long production runs of all types of tools and dies. In addition to long performance characteristics, Olympic FM yields a superior machined finish and easier machinability . . . factors resulting from the addition of alloy sulphides uniformly dispersed by the DESEGATIZED® process of manufacture.

For improved machinability and long production runs, order Olympic FM . . . over 250 sizes are stocked in ten conveniently located warehouses. Your order will be handled promptly and courteously.

BE SURE TO SEE THE ROTO-FLO IN ACTION!
MACHINE TOOL SHOW
Chicago—Sept. 6 thru 17th

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LATROBE, PENNSYLVANIA

Branch Offices and Warehouses in principal cities

PERSONNEL

Richard M. Upson, named personnel director, **SKF Industries,** Philadelphia.

John L. Cutter, White House correspondent, appointed public relations director, Chevrolet Motors Div., **General Motors Corp.,** Detroit.

W. W. Seabald and **William M. Akin** were elected vice-presidents of the **American Iron & Steel Institute.**

Charles A. Peters was elected controller, **A. Finkl & Sons Co.,** Chicago.

George R. Morin, was appointed manager of industrial engineering, Marketing Div., **Jones & Lamson Machine Co.,** Springfield, Vt.

William C. Kern, appointed Democratic commissioner of **Federal Trade Commission.**

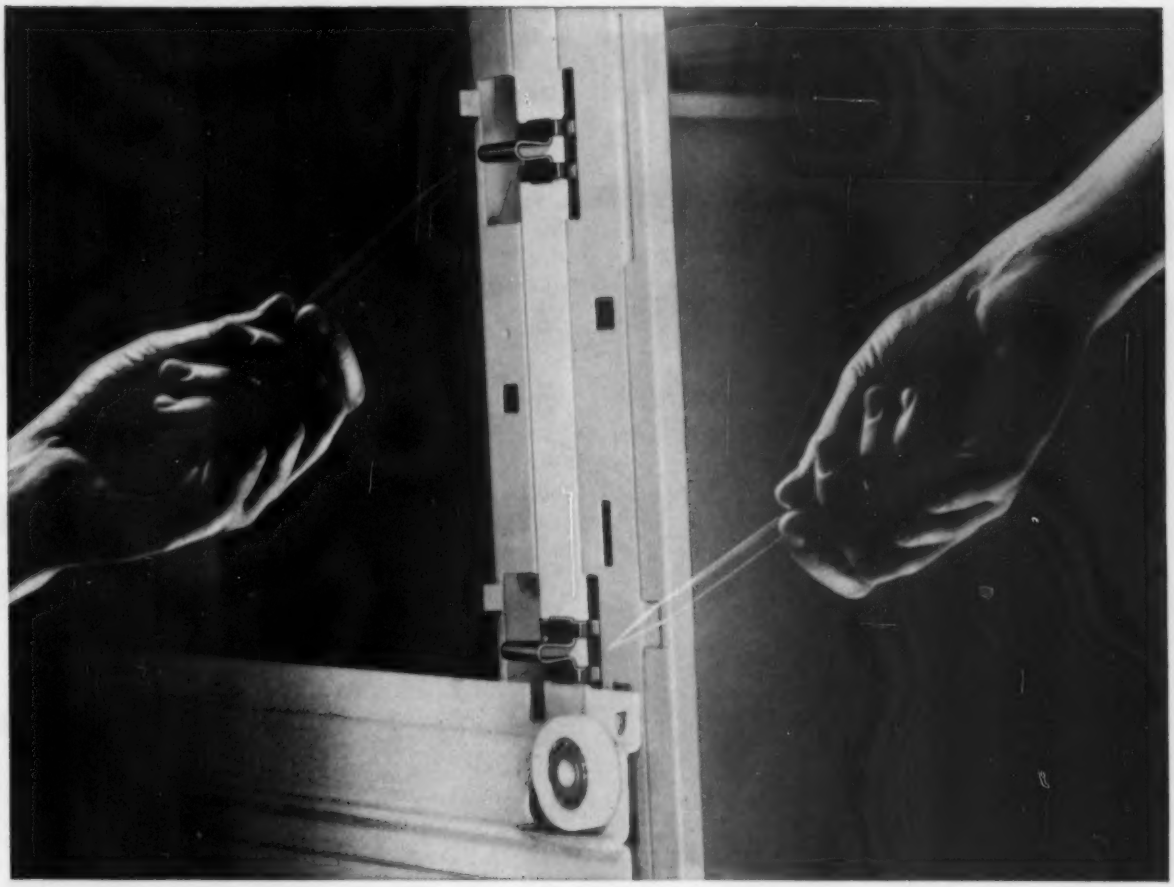
Fred Collins, appointed to public relations staff, **General Motors Corp.**

Curtis B. Hoffman, appointed vice-president in charge of sales, **Brush Electronics Co.,** Cleveland.

OBITUARIES

B. Frank Stoner, 73, official of **Baker - Raulang Co.,** Peninsula, Ohio.

Michael J. Wynn, 56, manager, **American Can Co.,** Hudson plant, Jersey City, N. J.



Engineered by Tinnerman . . .

THIS SPEED CLIP® GIVES DESK LINE EXTRA MODEL FLEXIBILITY . . . and saves money!

Here's the special SPEED CLIP that enabled the General Fireproofing Company, Youngstown, Ohio, to build maximum flexibility into its new "Generalaire" office furniture. A relatively small number of basic units can be interchanged to produce 46 different desk and table models. General Fireproofing reduces manufacturing and shipping costs; dealers have fewer parts to stock and handle!

This one-piece, spring-steel SPEED CLIP snaps easily and quickly into place by hand. It replaces a costly five-piece locking bar latch mechanism that had to be factory-installed in left- and right-hand assemblies. Now, SPEED CLIPS make it possible to ship knockdown locking bars to dealers who then build left- and right-hand assemblies from basic units to fill customers' orders. What's more, Generalaire desks are assembled throughout with 20 or more SPEED NUT brand fasteners which contribute greatly to this flexibility.

A free Tinnerman Fastening Analysis of your products may show similar assembly advantages with important production savings. See your Tinnerman representative soon and write for Fastening Analysis Service Bulletin No. 336.

TINNERMAN PRODUCTS, INC., Box 6688, Dept. 12, Cleveland 1, Ohio

Canada: Dominion Fasteners, Ltd., Hamilton, Ontario. *Great Britain:* Simmonds Aerocessories, Ltd., Treforest, Wales. *France:* Aerocessoires Simmonds, S. A., 7 rue Henri Barbusse, Levallois, (Seine). *Germany:* Hans Sickinger GmbH "MECANO", Lemgo-i-Lippe.

TINNERMAN Speed Nuts®
FASTEST THING IN FASTENINGS®

GET EXTRA SUB-HEARTH

SAFETY AND LONGER LIFE

WITH KAISER PERICLASE D-S BRICK →

THIS superior brick has been *especially designed* to withstand sub-hearth conditions. Thus, it gives maximum protection against costly breakthroughs and provides longer sub-hearth life.

Steel men agree on the important properties for a sub-hearth brick. They are all found in Kaiser Periclase D-S Brick.

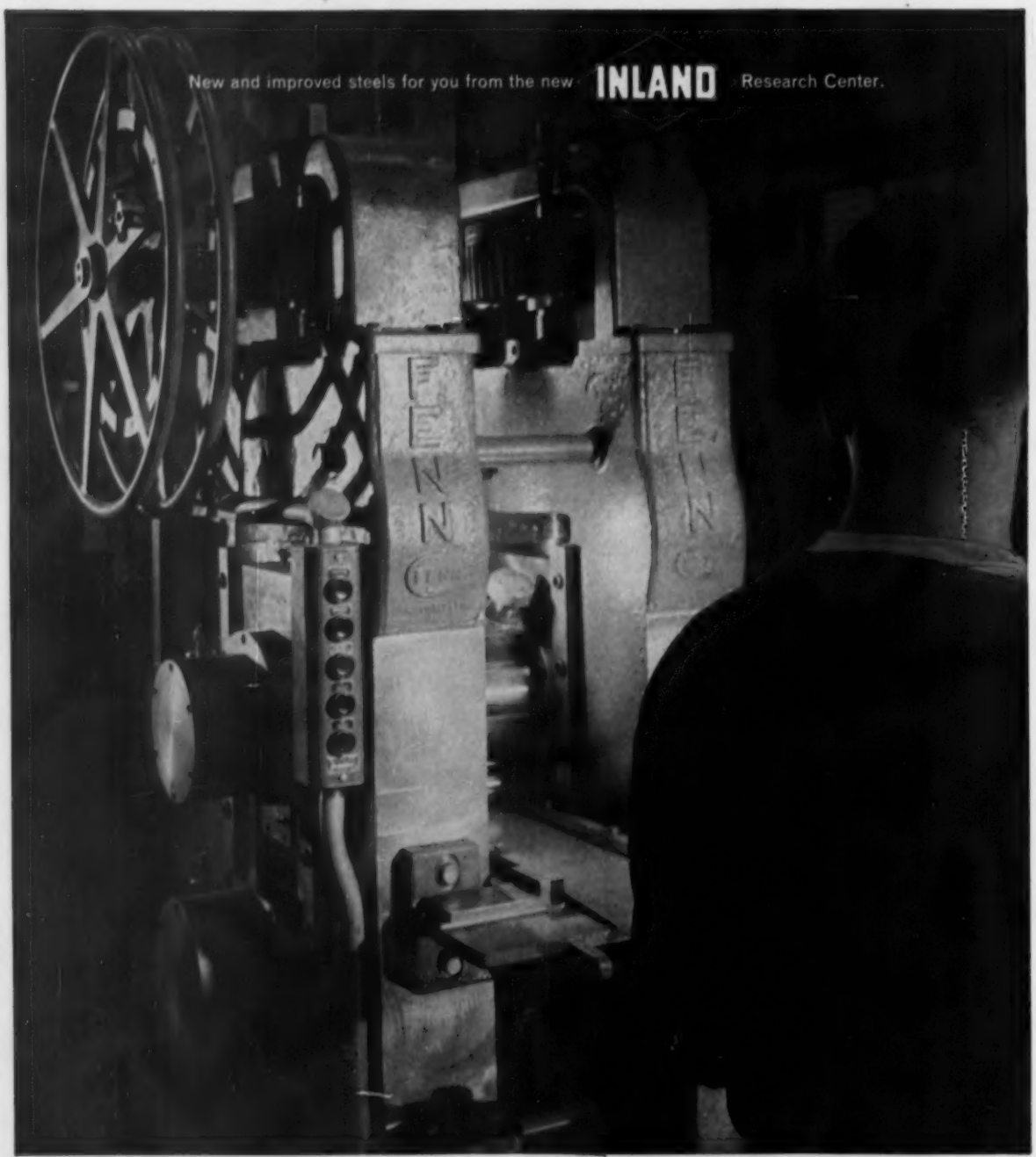
High MgO (more than 95%) is achieved through the use of pre-shrunk, accurately sized Periclase grains derived from sea-water magnesia. Absence of chrome eliminates the reduction of chromium oxide and damage to the refractory structure.

Low iron content minimizes refractory damage from alternate oxidation and reduction of iron oxide and other iron compounds. Absence of calcium oxide prevents damage caused by slaking during slow heat-ups or while furnace is idle.

With all its many advantages, Kaiser Periclase D-S Brick gives you the ultimate in sub-hearth safety and durability—*yet costs no more!*

Call or write Kaiser Chemicals Division, *Kaiser Aluminum & Chemical Sales, Inc. Regional Sales Offices: 1924 Broadway,* OAKLAND *12, California . . . First National Tower,* AKRON *8, Ohio . . . 518 Calumet Bldg., 5231 Hohman Avenue, Hammond, Indiana* (CHICAGO).

For the ultimate in steel furnace refractories . . .



THIS PINT-SIZE ROLLING MILL MAY SAVE YOU KING-SIZE HEADACHES (AND MONEY TOO!)

At Inland, "new ideas" are considered as vital a raw material in steelmaking as top grade iron ore and coal. Establishing reserves of this basic ingredient is a continuing job for Inland's research and development people. The new Inland Research Center in Hammond, Indiana, where Inland researchers look for better steels and more efficient ways to make them, is the most recent addition to Inland's "new idea" resources.

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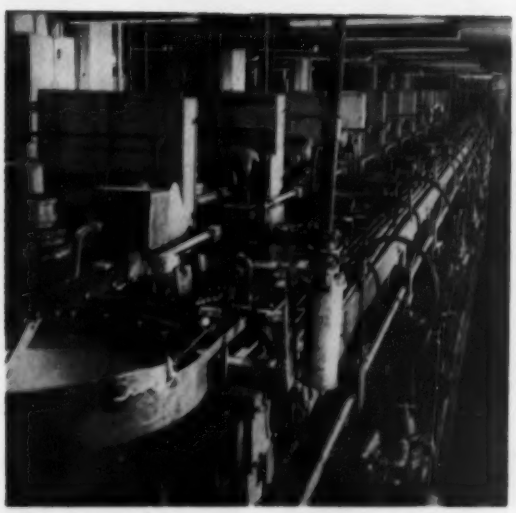
The Iron Age
FOUNDED 1855
TECHNICAL ARTICLES

Integrated system—

Automation Devices Tie In Machining Operations

◆ Groups of machine tools operating at different rates have been combined into a continuous setup for the production of pinion gears . . . Parts are loaded, unloaded, gaged and sorted automatically . . . Individual machines stop automatically if several successive parts are off size . . . But the system as a whole continues in operation.

By HERB CHASE, Consultant, Forest Hills, N. Y.



FEEDING devices on gear shapers receive ten blanks at a time from distributor system.

◆ CONTINUOUS PRODUCTION on groups of different machine tools operating at widely varying rates provide a striking example of the extent to which automation ideas are now being applied in industry. In the gear plant of the Buick Motor Div., Flint, Mich., such production is achieved on a relatively fine pitch planet pinion for the Dynaflow torque converter transmission.

Not only do the machines receive and discharge parts on a fully automatic basis but they are also gaged and sorted automatically. In most cases, a machine that produces more than three off-size parts in succession is stopped automatically, yet the line as a whole continues operating at a high rate.

For most operations two or more of each machine type are provided. Some are used singly but the conveyorized feeding arrangements have excess and storage capacity to keep all operating machines running.

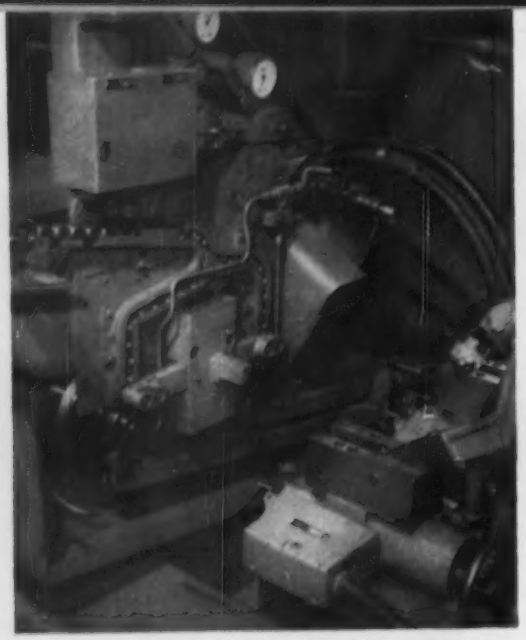


Fig. 1—Storage racks feed blanks to branch chute on two-spindle Boromatic machines.

Conveyors are largely flat-belt types which move continuously. They are so arranged that, if some of the machines are down or not running at capacity, parts are still distributed to the other machines.

Although the complete setup functions as an integrated and continuous system, it involves an interruption for heat-treating the pinions after primary machining. Heat-treating is done in a remote area of the same building, the pinions being carried to and from the operation in conveyor baskets.

Blanks of SAE 1330 steel are supplied with all dimensions machined so that, aside from cutting the teeth, only semi-finish and finishing operations are performed on the automated line. In general, progress is through machines in a row along one side of the plant and back along the row on the other side.

After inspection and gaging to prevent stock ends and bad blanks from entering the line. the blanks are passed through a Cincinnati centerless grinder which sizes the OD. This grinder is automatically size-controlled to a 0.0005 limit.

Parts feed to distributor

Parts then feed to a distributor and from there to three storage racks, each of which feeds a battery of two-spindle Heald Borematics, Fig. 1. On the first machine in each battery carbide tools controlled by cams finish face and chamfer the OD. The ID is semi-finish bored by another carbide tool which can be controlled by a Sheffield air gage.

Parts are ejected automatically from diaphragm chucks into a chute and roll to the Sheffield gage whose pin enters the hole. If the ID is outside limits the carbide tool is automatically adjusted 0.0005 in. to hold within a limit of 0.002 in. The machine is automatically shut down if three out of tolerance parts are produced consecutively.

All parts from the first machines go to storage racks and are then channeled to magazines feeding the second set of Borematics in the batteries. These function the same as the first group, finish boring the ID and machining the second face with similar OD chamfer. Gaging of the bore is also the same with the additional job of separating over size and under size parts and advancing accepted parts via an elevator to a gravity storage rack that feeds another air gage.

Gages on the second machines adjust the boring tool 0.0002 in. to hold within a limit of 0.0005 in. Segregation is within a limit of 0.0008 in.

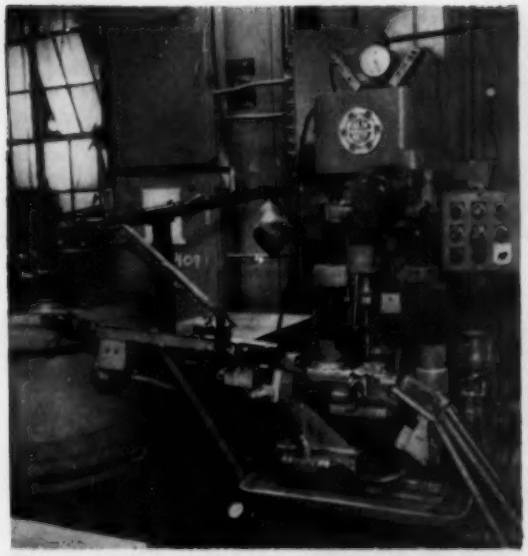
Parts coming from the Borematics with over size holes are checked for salvage or scrap. Those separated for under size holes are fed separately to a single Micromatic Microhoner, Fig. 2, which brings the hole within size limits and then advances the part to join the accepted work from the boring machines. This honing machine has an air gage that holds work within a limit of 0.0005 in. and actuates four pilot lights and two segregation gates for discharge of parts.

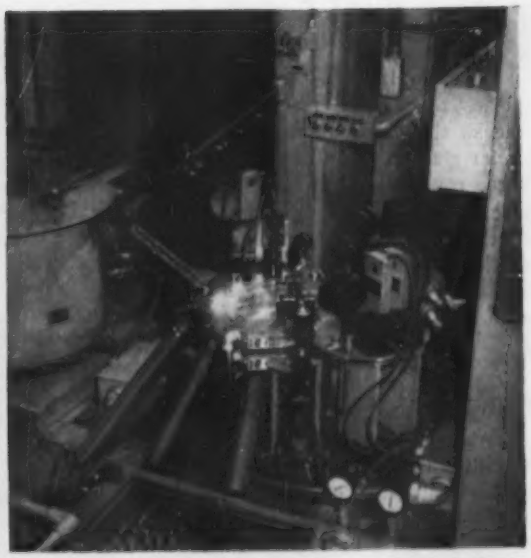
Cut one blank per minute

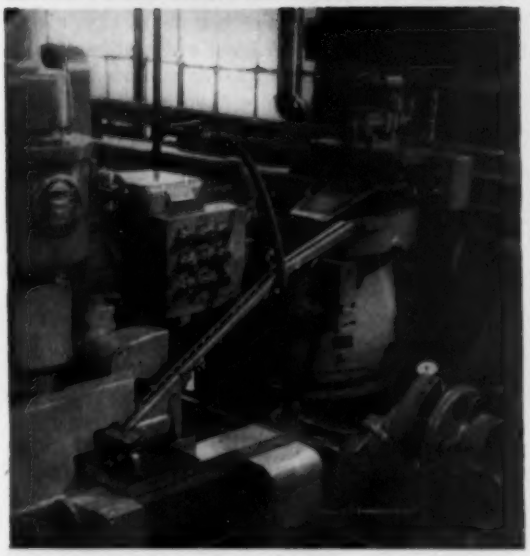
Before blanks go to gear shapers, all parts are passed through an automatic gaging and sorting machine, Fig. 3, that checks the hole for size and taper and also checks for thickness and face parellelism. Off size parts are segregated and others proceed to a distributor for feeding to 15 Syntrons serving gear shapers.

Since cutting of the 16 gear pinion teeth is the slowest operation in the line, a row of 15 Fellows 4 GS gear shapers, Fig. 4, is provided. Each shaper cuts teeth on about one blank a minute. The distributor releases 150 parts at a time. Traps on the conveyor give 10 parts to the Syntron bowl at each machine. If one of the machines is shut down for repairs or adjustment, a supervisor presses a button that adjusts the distributor to release only 140 parts and closes the trap on that individual machine, or ten less for each machine shut down.

From the feeding bowl parts go to a magazine chute from which they are loaded one at a time onto an arbor that expands to grip the piece on its bore, as the teeth are cut. When cutting is completed, the pinion is automatically air-ejected to remove chips and rolls down a chute into a rotating pickup. In this pickup, the pinion makes one revolution while







Top—Left:
Fig. 2—Parts segregated for undersize holes are brought within limits on this honing setup.

Top—Right:
Fig. 3—Automatic gaging and sorting machine checks pinions before entering gear shapers.

Above—Left:
Fig. 4—One of fifteen gear shapers in the line. Parts are loaded on arbor from a chute.

Above—Right:
Fig. 5—Grinder takes a light cut off each gear face, then gears pass through gaging station.

Right:
Fig. 6—Face ground pinions are fed to this machine where an oil groove is cut across face.

engaged with a gear sector to check any tooth interference.

After leaving the pickup device each pinion passes through a special indicator gage that checks the pitch diameter, segregates over or under size parts and also stops the machine if three consecutive parts are out of limits. On-size parts roll down a chute to a device that faces the burrs off even with the ends of the teeth, then to a belt for advance to a storage rack-distributor serving batteries of six gear shavers including two Fellows, two Michigan Rotary and two Red Ring.

Warning lights show error

Each shaver is equipped with a washing and gaging unit that cleans the gears and gages for size. Gears are segregated for within limits, over size and under size and again the gage will stop the machine after three consecutive errors. A system of warning lights indicate the type of error being made so a job setter can see the trouble and quickly make adjustments.

Pinions accepted by the checking devices on the shavers are discharged onto a belt that carries the pinions to the washing machine. After washing in an alkaline solution the pinions are loaded into wire conveyor baskets that carry the loads to heat treatment and later return the pinions ready for the final machining operations.

Before and after heat-treatment, sample pinions are sent to a gear laboratory for mechanical checking. Rockwell hardness testing is done after heat-treating.

Hardened pinions returned to the line are first loaded into a Roto-lift elevator supplying a Syntron feeder for a Sheffield automatic chamfering machine which grinds burrs from the acute angles at both ends of each tooth and chamfers teeth ends. Pinions leaving the machine are elevated into a storage unit feeding a Gardner grinder, Fig. 5, which takes a light cut off of each side face.

Each pinion is discharged from the grinder through a thickness gaging control so arranged that the machine stops if thickness limits are not held. The gage controls the grinding machine within a 0.0015 in. limit and segregates within a 0.002 in. limit.

Face-ground pinions feed to an elevator and storage unit from which they issue to an Auto-groove grinder, Fig. 6, that cuts an oil groove across each face of each pinion. A "Ferris-wheel" type of fixture carries the parts between the wheels. Since the depth is not critical no provision for stopping the machine for off-depth grooves is needed and there is no gaging. Pinions leave this grinder at the rate of 1800 an hour and are elevated to a storage and distribution unit that supplies the individual feeders at each of the six Micromatic hones for final sizing of the hole, via flat belts.

Each of the honing machines is equipped with magazine loading and unloading devices. There is also an automatic air gaging device that segregates parts having holes under, over and within size limits.

On-size parts are delivered by each honing machine to a common belt that carries the pinions to an International machine that gives each pinion a kerosene wash, a rinse and an air blowoff. Before washing, however, occasional parts from each honing machine are checked for lead on a Red Line Comparator and on gages for hole squareness with face.

From the washer, pinions are elevated to a storage and distribution unit that carries each pinion to one of six gear speeders. The gears are first run in one direction, braked and then the direction is reversed.

Each of these machines, Fig. 7, is equipped with an electronic "ear" that listens to the speeding operation and automatically ejects noisy gears. The pinions are automatically loaded on an expanding arbor and mesh with a master pinion. Spinning then starts automatically and stops for unloading and reloading the arbor, the checked pinion being ejected to a chute. A trap door in the chute—actuated by the electronic ear listening device—prevents noisy gears from continuing on the line.

Pinions passed through the gear speeder test are conveyed to one final gaging setup and then are ready for use since all critical dimensions have been checked automatically.

Taken as a whole, the checking is remarkably fast and efficient and results in a product of remarkably high and uniform quality. One hundred per cent gaging stops unacceptable gears from reaching the Buick Dynaflow plant.

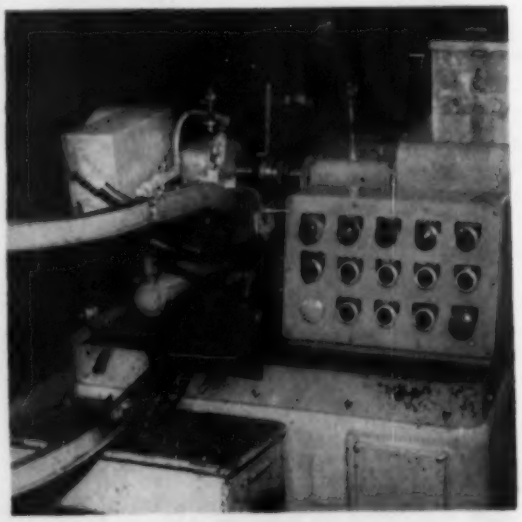


Fig. 7—Electric "ear" on gear speeders segregates noisy or otherwise defective gears.

Part I

Ingots 9 in. in diam—

Arc-Cast Molybdenum:

Better High Temperature Properties

◆ Larger sizes, higher density and lower gas content are the major advantages of arc-cast molybdenum . . . Add to this the unusual high temperature properties of molybdenum and its alloys, and the designer has at his disposal greatly improved materials for use in parts which must withstand high heat for long periods.

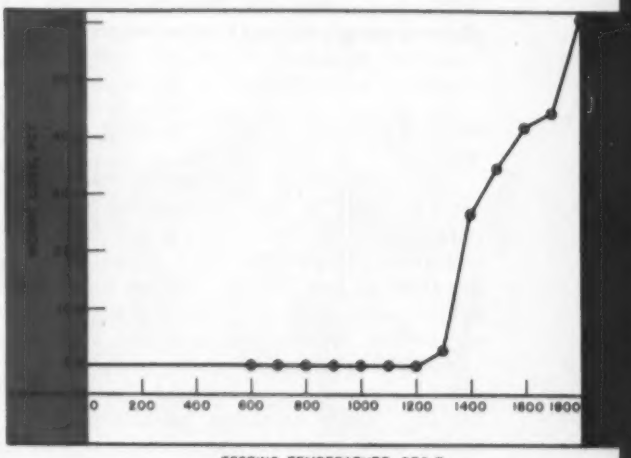
◆ THE PRESSURE of modern engineering development has spurred demand for materials capable of sustained operation at high temperatures. Arc-cast molybdenum and molybdenum base alloys, with their outstanding engineering properties, offer the design engineer important advantages in many applications.

Four arc-cast molybdenum alloys are now produced commercially by Climax Molybdenum Co. in addition to unalloyed molybdenum. These are: 0.3 pct Cb, bal Mo; 0.5 pct Ti, bal Mo; 1.0 pct V, bal Mo; 2.0 pct W, bal Mo. The first three alloys have better high temperature strength than unalloyed molybdenum; the last has better weldability.

Ingots to 9 in. in diam have been produced by arc casting. These have higher density than molybdenum produced by powder metallurgy and do not depend on mechanical working to reach theoretical density. Gas content is exceptionally low, particularly for oxygen which adversely affects ductility; superior weldability and machinability are reported. Arc-cast ingots can be converted by extrusion to billets and then broken down into sheets and bars. The way is now open for production of shapes from molybdenum base alloys having great structural strength at high temperatures.

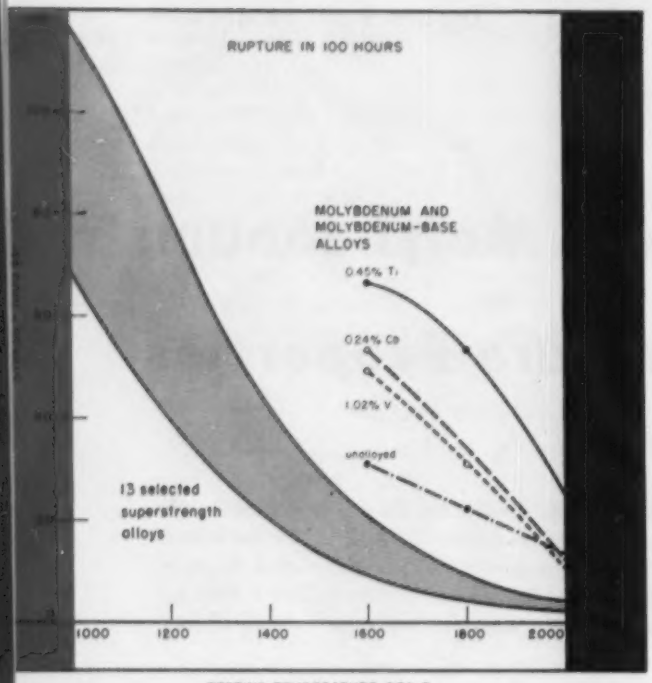
The 4730°F melting point of molybdenum, almost 2000°F above that of iron, permits its use at temperatures beyond the softening point of most materials. The useful strength of molybdenum alloys, above 1600°F, is greater than that of any other known material. The metal's stiffness at 1600°F is a third greater than that of steel at room temperature.

Molybdenum has exceptional thermal-shock resistance. Its electrical conductivity is about a third that of copper and it offers high resis-



EFFECT OF TEMPERATURE on oxidation of molybdenum sheet samples exposed to moving air for 30 minutes at various temperatures.

This article is the first of two articles on arc-cast molybdenum and molybdenum alloys. The second article, on fabrication of arc-cast molybdenum, will appear next week.



STRESS FOR RUPTURE in 100 hours of stress relieved molybdenum and three molybdenum base alloys as compared to 13 superstrength alloys.

tance to corrosion in many mediums, including molten sodium and lithium.

This combination of properties makes feasible the design of high temperature parts and equipment with high efficiency and better performance. Molybdenum-base alloys offer the designer of gas turbine, ramjet and guided missile parts most of the needed requirements except low density and oxidation resistance. The high strength and elastic modulus at elevated temperatures compensate for the high density. While oxidation resistance has retarded some applications, a practical solution to the problem of a satisfactory oxidation-resistant coating appears to have been found.

The use of molybdenum alloy buckets and guide vanes, for example, will permit an increase of 50 pct or more in gas-turbine output by increasing operating temperatures at least 300° to 400°F and opens the possibility of new designs with greater power and efficiency.

Because of its thermal-neutron absorption characteristics, molybdenum is expected to serve in nuclear reactors as a highly stressed construction material at temperatures above 1600°F. Molybdenum is one of the most promising refractory metals for resistance to liquid metals such as sodium, lithium and sodium-potassium mixtures involved in some projected nuclear power plants.

Molybdenum's unique properties, linked with improved methods of molybdenum production, could make the metal vastly more important to the metalworking industry in the future.

Experience with arc-cast molybdenum piercing points, used in production of alloy and stainless steel seamless tubing, has been encouraging despite the higher price of these piercing points relative to those made of other materials.

For best results, molybdenum alloy points must be used continuously without cooling. As many as 650 low alloy steel billets have been pierced by a single molybdenum alloy point containing 2 pct tungsten. Three piercing points of the 1 pct vanadium alloy pierced 278 stainless steel billets without reconditioning. Molybdenum alloy points have also given good results and have been adopted for piercing extra long stainless steel billets where alloy steel points are unusable.

Used experimentally for boring bars, molybdenum's high rigidity helps cut vibration and improve surface finish and accuracy of machined parts.

Use of molybdenum for hot-work dies in the future appears likely, particularly in diecasting brass and other alloys with relatively high melting points. It is almost impossible to heat check molybdenum base alloys. Additional development work is now under way on 0.5 pct Ti and 1 pct V alloys which have greater hot hardness than unalloyed molybdenum. Changes in die design may be needed for best performance of the molybdenum base alloys.

An excellent bond is obtained between sprayed molybdenum coatings and steel, aluminum and magnesium. Recently sprayed molybdenum has been used to give good wear resistance and long-lasting bearing surfaces, which are particularly outstanding when running against bronzes or white metals.

High resistance to arc erosion

Resistance welding electrodes and dies are faced with molybdenum for electrobrazing, electrical upsetting, and welding copper, brass and other high-conductivity materials. Molybdenum tips give long service without dressing and do not stick to the work.

Molybdenum's high resistance to arc erosion has led to its use for electrical contacts where contacts must resist mechanical wear and be substantially free from fusing characteristics.

Mechanical properties of molybdenum depend largely on the amount of working done below the recrystallization temperature. The four arc-cast molybdenum base alloys, like unalloyed molybdenum, are not heat treatable and depend on mechanical working for strengthening. The possibility of recrystallization sets a limit to the operating temperatures where

Melting Point 4730°F

100-hr Rupture Strength
53,000 psi (1800°F)
(0.5 pct Ti alloy)

Modulus of Elasticity
46,000,000 psi (70°F)
39,900,000 psi (1600°F)

Mean Coefficient of Linear Thermal Expansion
2.67×10^{-6} (32/200°F)
3.81×10^{-6} (32/3200°F)

Thermal Conductivity
76.5 BTU/ft²/ft/hr/°F (70°F)
58.5 BTU/ft²/ft/hr/°F (1600°F)

Specific Heat
0.06 BTU/lb/°F (77°F)
0.07 BTU/lb/°F (930°F)

Electrical Conductivity
34 pct IACS (32°F)

Corrosion Resistance
High resistance in many mediums including some important liquid metals

Properties of Arc-Cast Unalloyed Molybdenum

mechanical working can be used for strengthening. Alloy additions may extend the range where work-hardened molybdenum may be used by increasing the recrystallization temperatures. Titanium increases it considerably, columbium moderately, but small additions of vanadium and tungsten have practically no effect on the recrystallization temperature of molybdenum that has received a moderate degree of working.

The effect of alloy content on elevated-temperature strength is pronounced. The 0.45 pct Ti alloy proved to have the best hot strength, with unalloyed molybdenum lowest, and the 0.24 pct Cb and 1.02 pct V alloys intermediate. The ductility of molybdenum and its alloys at elevated temperatures is ample for almost all applications. In virtually all cases the final elongation in stress-rupture tests was over 10 pct for stress-relieved specimens, and two to three times greater for fully-recrystallized specimens.

Above 1000°F, unprotected molybdenum oxidizes rapidly in air or oxidizing atmospheres. But new methods of surface protection being developed will permit wider use of molybdenum's outstanding high temperature properties. A commercially feasible method of protecting molybdenum, where a useful life of 500 to 1000 hours is acceptable, will soon be possible.

Substitution of a reducing or inert atmosphere for air can prevent oxidation in some cases. In dry oxygen-deficient combustion gases, uncoated molybdenum may be used about 100 hours at temperatures to 2500°F. Where stresses are not high, and where impact and severe thermal shock are not involved, ceramic coatings offer long time protection.

Oxidation resistant metal coatings may be applied by electroplating, cladding, vapor-phase deposition, dip coating and spray coating. Coatings must be nonporous, gas tight, and free from imperfections. Moreover, if maximum strength and ductility, in the coated part are desired, temperatures used in forming the coating must not be so high as to cause recrystallization of the molybdenum.

Where electroplating is used, adherence, ductility and porosity are problems. Some chromium plated molybdenum parts have shown good results, but it has been difficult to consistently duplicate good performance. Heat treatment to densify plated coatings is not too successful.

Promising results have been obtained through cladding within the limitations of the relatively low melting points of the cladding material and the fact that edges must be protected by some other method.

Spray coating (metallizing) is a versatile method of protecting molybdenum parts. Neither the melting point of the deposited metal, nor the size and shape of the coated part, is particularly critical. Chemical compatibility of the deposited metal with molybdenum is not an important factor.

Has high corrosion resistance

As sprayed, coatings are only mechanically bonded and quite porous. To produce a metallurgical bond and reduce porosity, spray-coated parts are given a diffusion treatment at a temperature below the recrystallization temperature of the molybdenum. These coatings give consistent protection against oxidation, withstand thermal shock, and sustain a limited amount of plastic deformation at high temperatures. Typical sprayed metal coating consists of 20 pct Al and 80 pct of an alloy containing about 56 pct Cr and 41 pct Si.

Resistance to corrosion is one of the potentially valuable properties of molybdenum. The metal has particularly good resistance to hydrofluoric and hydrochloric acids if oxidizing agents are not present. Molybdenum also appears worthy of consideration for phosphoric acid, acetic acid, chromic acid and sulphuric acid solutions under many conditions, including intermediate concentrations at high temperatures. It is, however, rapidly attacked by boiling concentrated sulphuric acid. Generally, molybdenum is not suitable for oxidizing acids such as nitric acid and aqua regia, although it may be passive in concentrated solutions at room temperature.

The excellent resistance of molybdenum to attack by most liquid metals could be of major significance in the future. Molybdenum is used in mercury switches for electrodes because it does not amalgamate or react with mercury. Tin is one of the few molten metals that severely attack molybdenum. Molybdenum is corroded by fused but not by aqueous caustic alkalies.

For commercial items—

Investment Castings Find New Cost-Cutting Uses

◆ Components that require the assembly of small parts can often be produced more simply and economically by investment casting . . . Precision-cast dimensions and smooth finish can also help solve tough machining jobs.

◆ Investment casting experience gained with military items is spreading out to cut costs on industrial and commercial products . . . Examples are found in builders' hardware and other items using a wide range of alloys.

◆ WHILE THEIR APPLICATIONS in the manufacture of defense items such as guided missiles, military aircraft, wave guides and the like are well known, the contributions of investment castings to non-military products are considerably less familiar. Nevertheless, the advantages of this precision casting process are applied every day to the manufacture of numerous industrial and commercial products.

Investment casting can produce, as a single component, a unit that otherwise might require the construction of several pieces. It thereby eliminates the necessity and cost of assembling and joining these pieces. The process also reduces the overall cost of many products by reducing or eliminating subsequent machining operations. Integrally cast features such as blind holes and sockets help serve this end.

Elimination of machining operations often makes it possible to use certain metals, high temperature alloys for example, which would either be impossible or far too costly to machine in a secondary operation.

Typical of non-military applications for investment castings are some in the architectural field. Here the process is applied to transform aluminum, stainless steel and copper base alloys into builder's hardware items of complex shape.

The high cost of doing heavy machining on phosphor bronze rod or extrusions led one major builder of metal windows to investigate, test and finally switch to investment castings for window locks. The castings gave completely satisfactory performance at lowered cost, while reducing in-plant processing.

The lock housing is cast in an aluminum silicon-magnesium alloy whose commercial designation is No. 356. The latch cylinder and latch bolt are investment cast in 18-8 stainless steel.

Reduce machining

Most impressive for its complexity, and, therefore, the amount of machining saved, is the lock housing. An accompanying photograph shows the investment cast housing together with the machined extrusion which it replaced. Some of the former machining operations are apparent, including the drilling and boring of a ½ in. hole for the latch cylinder, milling of slots and dovetail recesses, and drilling and countersinking of mounting and set screw holes. In the investment cast housing, only the set screw hole is drilled and tapped.

On the first order of 17,000 cast housings, including amortization of tooling costs, the finished piece price was considerably less than that of the machined extrusion.

Certain lock housing design changes were sug-

gested by the vendor to gain maximum advantage from the casting process. Among these were the inclusion of metal reliefs which not only reduced part weight, but also improved structural soundness.

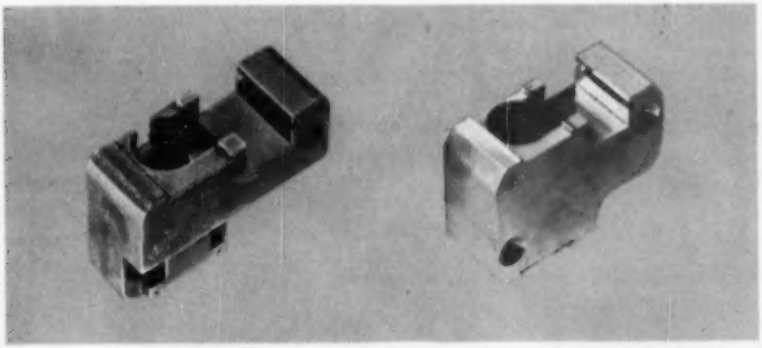
Another design change suggested by the vendor concerned the manner in which the latch cylinder is retained in the lock housing. Two stamped plates are used for this purpose. On the extruded housing, these plates slipped into dovetail grooves on the top and bottom of the housing. The same grooves were specified for the investment cast housing, but the vendor recommended that their shape be changed to eliminate the sharp dovetail angles. The change was made and in no way affects the function of the cylinder retainers. The old and new groove designs are apparent in the photographs.

Another example of costs saved through a switch to investment casting is a knock for a complex mechanism that was originally machined from hexagonal bar stock. It is now investment cast in corrosion resistant steel, as illustrated, and more than ½ hour of machining time is saved on each part.

For this knob, both dimensional accuracy and finish are important. The investment casting meets both of these critical requirements even though some of the dimensioning approaches the limit of possibility with the process.

For example, center sections of both the top and bottom surfaces are cast to a countersunk form, and the distance between the countersunk faces must be held to a total variation of −0.002 in. in a length of 0.656 in. There are several other dimensions where the tolerances are equally critical. Despite this extreme closeness (that is, close for the casting process) uniform production is maintained without difficulty.

The finest surface required on the part is 63 microinches rms, well within the normal finish range obtained with investment castings.



Left: **INVESTMENT cast lock housing (left) needs much less machining than extruded housing (right).**

Below: **LOCK'S investment cast parts include aluminum housing, 18-8 stainless cylinder and bolt.**

Right: **MORE than ½ hour of machining time is saved by investment casting this alloy steel knob.**

It stores information—

New Control System Cuts Scrap Loss on Tube Welding Line

◆ A new automatic control system for an induction welding tube line measures strip thickness, stores this information while the tubing is being formed, then sets the welding current accordingly.

◆ In making conduit, the system will save thousands of dollars yearly by reducing the rejection rate . . . Previously, the operator continually had to watch the color of the seams and change heat input as needed . . . Now, he merely monitors the control system.

By D. C. FISHER, General Engineering Laboratory, General Electric Co., Schenectady.

◆ SCRAP REDUCTION on a unique conduit manufacturing line at Mahoning Valley Steel Co., Niles, Ohio, will save thousands of dollars yearly. This saving will be brought about by a new automatic control system for an induction welding setup. The firm is probably the only one in the country making electrical tubing with induction welded seams.

Tubing is formed from a continuous, flat, moving strip of steel and seam welded. Unlike in resistance welding, there is no physical contact between the moving tube and the induction welding head. The copper inductor or welding head, which is about one foot long, is held 0.060 in. above the moving tube.

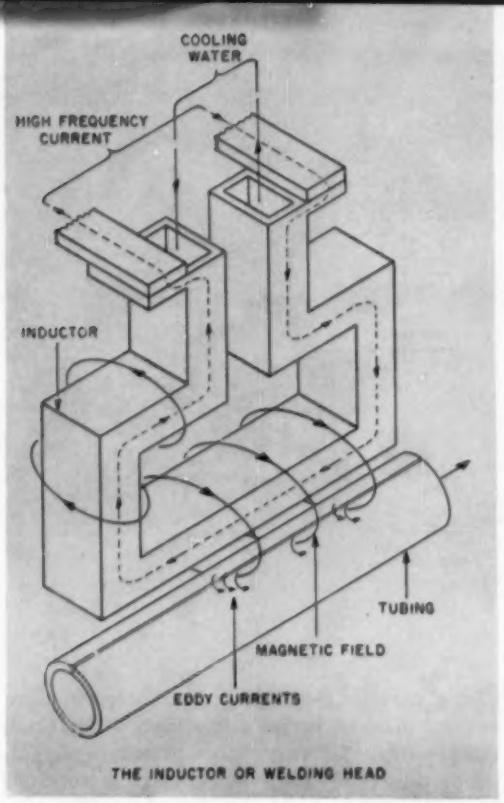
Line speeds of more than 200 fpm can be obtained by induction welding, or about 40 fpm more than by resistance welding. Furthermore, there are no burrs to remove as is the case after resistance welding.

By passing a large, high-frequency current at 9.6 kc through the water-cooled inductor, an alternating magnetic field is produced. Eddy currents induced by the field, heat a ¼-in. wide strip along the tube seam to welding temperature. The burr-free seam is then forced together. Because the inductor contains no moving parts that must contact the tube, there is no mechanical wear.

Power for this device is supplied by two 150 kva high-frequency generators, controlled by a pair of rotating amplifiers (amplidynes). By watching the color of the hot tube seam, the line operator can determine the welding temperature. He adjusts an amplidyne control potentiometer to increase or decrease the inductor current, depending on the seam color.

Control stores information

Previously, induction welding heat needed frequent adjustment because steel thickness varied. Usually, steel at the beginning and end of each reel is thicker or thinner than the center section. Because of this, one setting for welding temperature would not produce consistently good seams. Moreover, an operator could not always detect a poor weld by its color. It was only after the tube was cut to 10-ft lengths that the inspector called back to the operator to either increase or decrease weld-



THE INDUCTOR OR WELDING HEAD

COPPER INDUCTOR, or welding head, spaced 0.060 in. above moving tubing, welds seam at 200 fpm.

ing heat. By then, about 100 ft of poorly welded tubing had been produced. About 5 pct of the tubing was under par in quality.

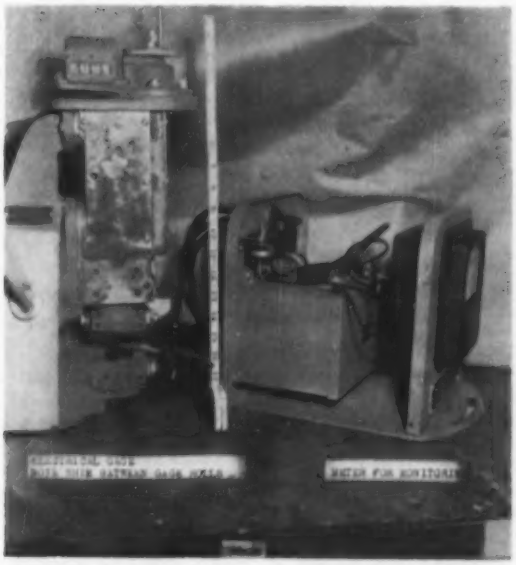
To reduce this loss, General Electric Co.'s General Engineering Laboratory designed and constructed an automatic welding current control system which not only measures the thickness of the strip, but stores this information while the tubing is being formed, then sets the welding current accordingly.

Strip thickness is now measured by a Pratt & Whitney electrical gage with an accuracy of 0.0005 in. It can be set in increments of 0.0001 in., ranging from 0 to 0.375 in. A meter for monitoring this signal is on the operator's control desk.

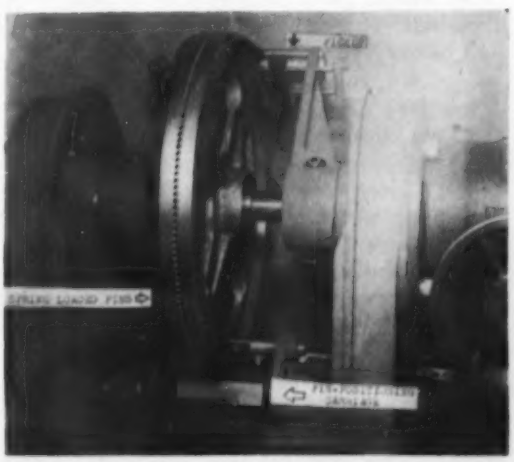
If the electrical gage is set to 0.010 in. and a strip of that thickness is passing through it, the meter will read zero. But if the thickness increases to 0.013 in., the meter will read + 3, and for 0.007 in. steel it will read — 3. The gage is placed on the conduit line about 14 ft ahead of the welding head.

A special device called a proportional synchronizer, developed recently by Pratt & Whitney, and sometimes called a synchrometer, solved the information storage problem. This device consists of a wheel directly coupled to the conduit line. In its periphery are 360 spring-loaded pins and at the bottom is a pin-positioning carriage. As the wheel rotates, the pins must pass between two wedges on this carriage. The profile of the pins form a variable cam surface as the carriage moves back and forth. At the top of the wheel, a pickup (differential transformer) detects the pin position.

The signal from the electrical gage is fed to the servo amplifier in the base of the syn-



ELECTRICAL GAGE located 14 ft ahead of welding head sends signal of sheet thickness to meter.



SYNCHROMETER coupled directly to conduit line stores information until tubing reaches head.

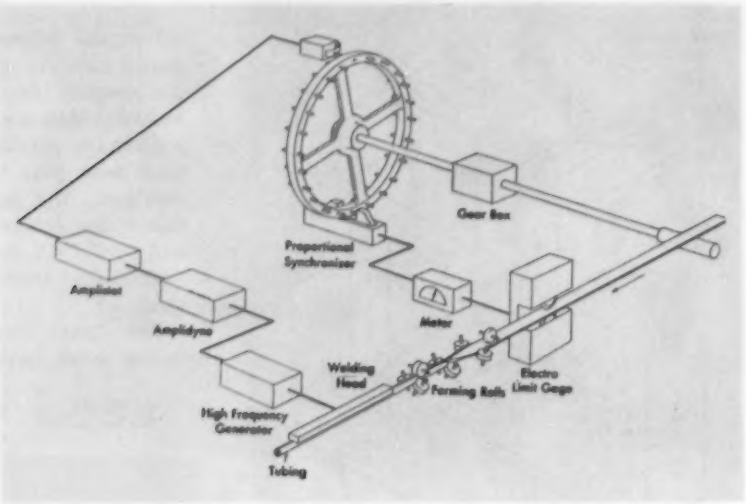


DIAGRAM shows elements of induction welding control system and how they apply to tube line.

chronizer. The amplifier in turn drives a small motor which sets the pin-positioning carriage. When no signal is received from the electrical gage, meaning that the steel strip thickness is equal to the gage setting, the pin-positioning carriage remains in the center. All pins are thus set so an equal length protrudes from each side of the wheel.

If the metal thickness increases, the pin-positioning carriage is driven a proportional distance in one direction. If the metal thickness decreases, the carriage is driven in the opposite direction. Actually, the surface profile of the pins is an exaggerated profile of the metal strip thickness. For this system the gradient can be set so that a 0.001-in. change in metal thickness will move the pins 0.25 in.

Because the synchronizer, or pin wheel, is coupled directly to the conduit line, its speed is governed by the moving steel strip. The gear ratio of the drive is such that the time delay needed for a strip of steel to pass from the electrical gage, through the forming rolls, and to the welding head, is equal to the time needed for the pin wheel to make about a half revolution. With the steel strip moving at 200 fpm, the thickness information must be stored for about four seconds.

For a given speed there are two ways to adjust this storage time: (1) by changing the gear ratio of the drive, or (2) by moving the support for the pickup. This support is about 200° around the wheel from the pin-positioning carriage at the bottom. It can be brought to within 24° of either side of the carriage. The pin wheel can be rotated in either direction.

A pickup at the top of the wheel drives an amplistat. Its output varies the control fields of the two amplidynes that control the high-frequency generators. These generators in turn supply the power to the inductor.

For varying metal strip thickness, welding current must be varied accordingly to maintain good welds. To vary this current, a signal, proportional to strip thickness, is received from the pickup on the synchronizer. This signal drives the control windings of the amplistat, the output of which is rectified and varies the potential in the amplidyne circuit. The amplidyne control signal is thus varied proportionally to steel strip thickness without modifying any existing circuits.

With this process, the information is stored magnetically on a device similar to a tape recorder. Instead of using tape, however, the information is stored on a magnetic drum. This information is recorded on one side of the drum, and after it rotates through a certain number of degrees, a second magnetic device detects the information.

Faults located easily

One advantage of the synchronizer over the magnetic recorder is that the pins can be seen as they are moved by the positioning carriage. The stored information on the magnetic drum cannot be seen without resorting to expensive instruments. It is, therefore, easier to locate a fault with the synchronizer than with the drum. The synchronizer is also a more rugged, industrial-type device.

Although the welding control is the first application for the proportional synchronizer, similar wheels are used in the steel industry for detecting pin holes in moving sheets of steel. There, the wheel provides only on-off information. With the synchronizer, however, the pins are set proportionally to a signal and thus provide finite information. The new control system can be modified to control welding current as a function of metal thickness in most tube welding operations.

A "yes-no" device—

Ultrasonic Transmission Tester Speeds, Simplifies Production Inspection

◆ Where both sides of a test piece are accessible, the ultrasonic transmission type tester offers the speed, simplicity and economy desired for production inspection . . . The device evaluates the test piece by its ultrasonic conduction, giving a direct reading of acceptance or rejection of the part.

◆ The method is nondestructive . . . An operator can learn to use it with confidence in a matter of minutes . . . In one critical operation, it detected every defective bolt . . . Moreover, it required only 1¼ hours per 1000 bolts whereas the previous method took 10 hours.

By N. W. SCHUBRING,
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Research Laboratories Div.,
General Motors Corp.,
Detroit

◆ NEED for thorough inspection to assure highly reliable parts has stimulated the development of today's complex ultrasonic equipment. As a result, several methods are now in use.[1] Where both opposite sides of a test piece are accessible and a "yes-no" indication is more important than dimensioning parts or pinpointing flaws, the ultrasonic transmission tester developed by General Motors Research Laboratories is often the most practical. It evaluates a medium by its ultrasonic conduction.

Ultrasonic transmission consists essentially of an ultrasonic energy source radiating a narrow beam of fixed intensity into a test piece. An intensity measuring device is positioned in the region where the vibrational energy emerges from the part. Discontinuities in the transmission medium, uupon intercepting the beam, reduce energy transfer and yield a comparative indication of test piece quality.

Comparison of the ultrasonic transmission method with the established pulse-echo,[2] resonance[3,4] and frequency-modulation methods is facilitated by a brief review of ultrasonic behavior. At the low end of the ultrasonic spectrum, the vibrations behave as audible sound. The wavelengths are long and any ultrasonic generator of practical size appears as a point source. This results in a spherical wave radiating from the source in all directions.

At the higher end of the utrasonic spectrum, the vibrations behave more nearly as light. The wave lengths now become very short and the source of ultrasound appears large compared to

the wave length. If a vibrating disk with a diameter about 10 or 12 times the wave length is used as a source, the radiated wave becomes more nearly a plane wave. Thus, highly directive beaming of acoustical radiation is achieved.

At high frequencies, such a vibrating slab can be small enough to be practical. Herein lies the great value of ultrasonics in the field of nondestructive inspection. Beaming is easily accomplished and permits attaining high vibrational intensities in a direction that can be precisely prophesied, thus yielding an invisible, massless, "yardstick" for "seeing" into opaque, dense media.

As with light, an ultrasonic beam obeys laws of reflection and refraction. Reflection occurs at every interface, even those of molecular magnitude, to a degree determined by the mismatch of acoustical impedances between adjacent media.

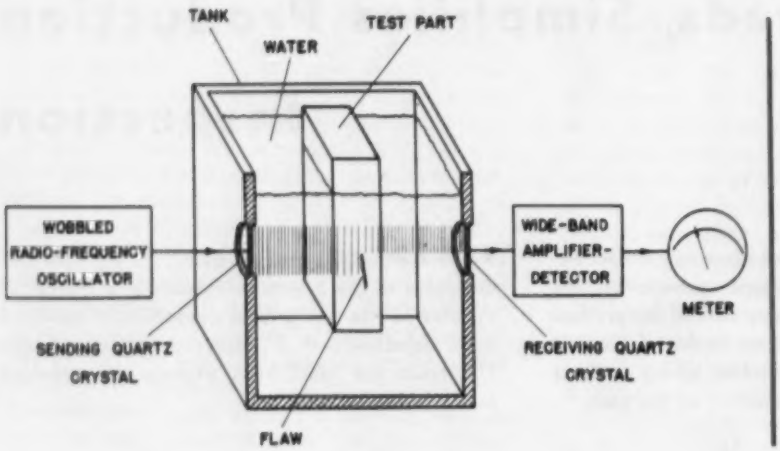


Fig. 1—Diagram shows how the ultrasonic transmission tester evaluates quality of a part.

A solid-gas or liquid-gas interface generally results in nearly complete reflection whereas solid-liquid interfaces transmit moderately well. Therefore, cracks, inclusions, blow holes, fissures and large grain structure tend to reduce the intensity of a directed beam. Consequently, a transmission medium has associated with it scattering, diffusion, and absorption of ultrasonic energy to a degree determined by the quality of a particular material.

These attributes, plus the finite velocity of ultrasonic propagation in a given material, comprise the bases for the pulse-echo, resonance, and frequency-modulation techniques. All are inherently dimensioning devices, but often find their greatest use as quality evaluators. In fact, each has been designed to perform the measurement function when only one surface of the test piece is accessible.

Conversely, the ultrasonic transmission technique schematically illustrated in Fig. 1 is not primarily concerned with dimensioning but almost exclusively with quality evaluation. Furthermore, since the surfaces on most production parts are readily accessible for inspection, the special single access feature may be eliminated at no sacrifice in ease of inspection.

Complex timing circuits based on the velocity characteristic can also be eliminated as can circuits usually required to periodically interchange the function of a single transducer from sender to receiver. Thus, the equipment is simple, easy to operate, and economical.

Since time relationships are inconsequential, the cathode ray tube-type display may be replaced by an inexpensive, but entirely adequate, meter-type indicator. Still another advantage of such simplified equipment is that it can very easily be made automatic or semiautomatic.

The composite unit, shown in Fig. 2, includes a test tank and cradle for small parts. The electronic transmitter and receiver are contained in the cabinet; the sending and receiving transducers for interchanging electrical and ultrasonic energy are mounted in the sides of the tank. Adjustable wand-type transducers can be immersed in any tank and will accommodate a variety of parts.

Supplies direct reading

A wobbled radio-frequency oscillator signal is applied to a quartz sending crystal which, due to its inverse piezoelectric effect, responds with a change in thickness in accordance with the signal voltage appearing across its major faces. This results in a corresponding ultrasonic signal of wobbled frequency directively radiated into the tank of water. Here, the beam is intercepted by a test part which functions to transmit the energy to a degree dependent upon test piece quality.

A receiving quartz crystal, positioned in the path of the emerging energy, functions via the

piezoelectric effect to provide an electrical signal in sympathy with the mechanical vibrations received. This electrical signal is then amplified, detected, and finally metered to supply a reading related directly to test piece quality.

The inadequacy of early transmission-type testers is attributed to the use of a fixed-frequency source of ultrasonic radiation. Since the wave length in most materials at the common frequencies used for ultrasonic inspection are in the order of only a few thousandths of an inch, dimensional variation of production parts often covered the range of one-quarter wave length or more. If the test piece was an even, integral number of quarter wave lengths at the test frequency, standing wave harmonic resonance was established with the result that an abnormally high level of energy was transferred when compared to the case at which the test piece was an odd, integral number of quarter wave lengths.

Fig. 2—Composite unit includes universal test tank and cradle for small parts, electronic transmitter and receiver, and transducers.

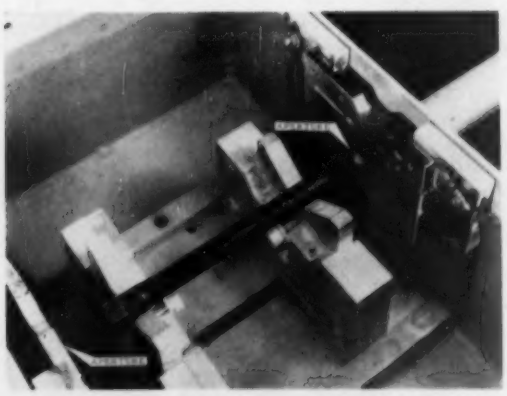


Fig. 3—Apertures smaller in diameter than bolt reduce effective beam cross-section.

The difficulty has been eliminated in the GM ultrasonic transmission tester by using a continually varying frequency source that is wobbulated at the 60-cps line frequency across one octave, usually 1.5 to 3.0 megacycles per second. The indicating means is not permitted to respond to these line frequency variations. In this way, all resonance effects due to dimensional variations are averaged out to provide a reading dependent only on test piece quality, including surface conditions.

In using the GM instrument, test piece surfaces need not be machined smoothly as is usually required for instruments involving intimate transducer contact with the part. Coupling can be accomplished easily by submersion in a liquid medium which commonly consists of water containing a wetting agent and possibly a rust inhibitor.

On a test piece having a diameter less than that of the transducers, air-filled brass boxes with apertures of a diameter slightly less than that of the test piece are positioned before each transducer to reduce the effective area of the ultrasonic beam. This arrangement, shown in Fig. 3 assures that all ultrasonic energy arriving at the receiver passes through the part.

Ultrasonic radiation obeys the laws of refraction as does light. Similarly, ultrasonic lenses can be constructed to focus ultrasonic energy, thus reducing the beam diameter to accommodate small parts or to increase sensitivity to small flaws in large parts. However, on large parts a reduced beam increases inspection time in that finer scanning is required. Lucite is used as a lens material.

Another feature of the GM unit is a relay, electrically in series with the meter, which can be adjusted to trigger at a predetermined amplitude of ultrasonic transmission. It operates a light on the instrument panel for more positive indication, or it may be used to actuate external "go, no-go" equipment for special operations.

Inasmuch as the GM tester is a comparative type instrument, standards must be established. Very often a standard or "par" reading for a given test must be determined by a destructive process which involves obtaining a distribution of transmission readings followed by sectioning of several samples. Some variation in transmission readings, even on sound parts, must be anticipated due to production variation in surface roughness, surface waviness, part distortion, nonparallelism of critical surfaces and slight variation in positioning in the ultrasonic beam. The "par" reading must be adjusted to exclude the highest reading obtained from a defective part.

The ideal type of distribution curve is shown in Fig. 4. Setting "par" at the dotted line will

Fig. 4—Ideal distribution curve sets "par" at dotted line. The GM tester rejects all flawed parts and passes all the good ones.

Fig. 5—A distribution curve encountered often rejects all flawed parts, but it also rejects a number of satisfactory pieces.

reject all flawed parts and pass all good ones. A type of distribution encountered more often is shown in Fig. 5. In this case, the safe "par" reading necessary to reject all flawed parts would also reject a number of satisfactory pieces. The problem is to determine whether additional surface preparation to separate the curves would be less expensive than the rejection of some good parts.

Shows cumulative effect

The big advantage of the frequency-modulated continuous-wave ultrasonic transmission tester is that it is the simplest of all ultrasonic inspection equipment to operate. An unskilled worker can be taught to use the instrument with confidence in a few minutes. The indicating device need not, and cannot, be interpreted in terms of voids, inclusions, porosity, pipes, laminations or abnormal grain structures. Nor can the depth of a flaw be determined unless orthogonal scanning techniques are used. However, for a high-rate, production-type test where precise interpretation is of no particular value, the method is excellent.

A transmission test does not show the time sequence of events but only their cumulative effect. It is conceivable that a condition of general porosity could exist which might not sufficiently weaken the test piece to justify its rejection. On the other hand, a single void in an otherwise sound part resulting in identical attenuation of ultrasonic energy could be dangerous. Such effects can be provided for in establishing tests where production volumes are involved.

One of the earliest successful applications for this tester was that of detecting cup flaws in cylinder-head bolts. These flaws were produced in the drawing operation prior to thread rolling. An unflawed bolt with flatly ground ends was chosen as reference. Its transmission was arbitrarily termed 100 pct. Standards were established by sectioning samples which gave widely different readings.

Two types of flaws were revealed—pipes and cup flaws. The percentage of transmission through cupped bolts fell between 0 and 6. Of several hundred thousand bolts inspected, thousands were rejected. Inspections were performed by unskilled operators at rates to 800 per hr.

No failures in production torque wrenching were reported for bolts inspected with the GM unit. It is interesting to note that the ultrasound transmitted is often reduced far more than the percentage of reduction in cross-sectional area. For this reason, filamentary pipe flaws can be detected.

One division of GM uses the tester to inspect critical butt welded center bolts for oil filter assemblies. Here, 100-pct non-destructive testing at production rates is essential. Previously, a semi-nondestructive method involved the application of a torque which sometimes left the part in an incipiently flawed condition. Not only has the ultrasonic transmission tester detected every defective bolt, but has reduced inspection time from 10 hours to 1¼ hours per 1000 bolts.

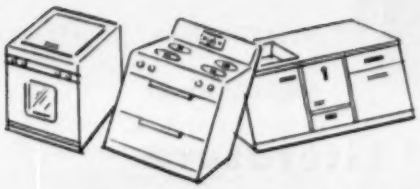
No single ultrasonic inspection instrument is ideal for all inspection problems. Each problem must be thoroughly analyzed and a test judiciously chosen weighing initial cost, unit cost, inspection rates and other factors. For trouble-shooting, an absolute indicating instrument would be desirable. For comparative type indications, transmission testing offers definite advantages.

ACKNOWLEDGMENTS

The author thanks Dr. G. M. Rassweiler, Assistant Head of the Physics and Instrumentation Department, for his part in developing the ultrasonic transmission technique and expresses indebtedness to Mr. P. Radics and the late Mr. W. Erwin who cooperated in developing the pilot model.

REFERENCES

1—Weller, E. F., ABC's of Ultrasonic Inspection, Steel Processing, v. 40, No. 11, Nov. 1954, pp. 706-14. 2—Firestone, F. A., Flaw Detecting Device and Measuring Instrument, U. S. Patent 2280226, April 21, 1942. 3—Rassweiler, G. M. and Erwin, W. S., Automatic Sonic Measuring Means, U. S. Patent 2431234, Nov. 18, 1947. 4—Erwin, W. S., and Rassweiler, G. M., The Automatic Sonigage, The Iron Age, v. 160, No. 4, July 24, 1947, pp. 48-55.



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New Technical Literature

Catalogues and Bulletins

Heavy duty cranes

Jones KL mobile cranes are described in a brochure. Several models are illustrated, and there is a list of the advantages and various specifications of each model. Specifications include: maximum load, power unit, types of mounting, weight of crane, optional equipment. *George Cohen Sons & Co., Ltd.*

For free copy circle No. 1 on postcard, p. 97.

Exact

Industrial advertising inquiry response and follow-up system, which is facilitated by a new tool providing exact control of the all-important activity of "handling" prospects who have voluntarily expressed an interest in your product through inquiry, is described in a bulletin. *Advertising Controls Inc.*

For free copy circle No. 2 on postcard, p. 97.

Fansteel 77 metal

This new heavy metal, which is a machinable tungsten-copper-nickel alloy used where high density is required in small space, is described in a 20-page illustrated book. The book includes a number of valuable reference tables and charts. *Fansteel Metallurgical Corp., Metals and Fabrication Div.*

For free copy circle No. 3 on postcard, p. 97.

Lathes and drills

The new Cincinnati 16 in. sliding head drill is illustrated and described in a catalog. It can be equipped with power feed at slight additional cost, bringing the production advantages of automatic operation within the budget of any shop. Features and advantages are described in detail. *Cincinnati Lathe & Tool Co.*

For free copy circle No. 4 on postcard, p. 97.

FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 97.

Materials handling

Materials handling operations in connection with storage and shipping finished rolls of tissue paper, one-time carbon, crepe and wax papers are performed quickly and efficiently by fork lift trucks. Complete details are included in the booklet. *Towmotor Corp.*

For free copy circle No. 5 on postcard, p. 97.

Impregnation

The Weseco impregnation process, which does not affect tolerances or critical machined areas, but will increase profits by eliminating all porosity in castings, is described in an illustrated color leaflet. *Western Sealant Co.*

For free copy circle No. 6 on postcard, p. 97.

Expanded stainless steel

Expanded stainless steel is detailed in a 4-page folder. Available in Type 304, 18-8, Penmetal expanded stainless steel is stainless steel sheet which has been slit and expanded to as much as 10 times its original width. Because of its resistance to corrosives and to abrasion, expanded stainless steel is adapted to applications in chemical handling, laboratory and hospital equipment and in other fields as well as for decorative purposes. *Penn Metal Co., Inc.*

For free copy circle No. 7 on postcard, p. 97.

FREE TECHNICAL LITERATURE

Metal chilling

A new catalog illustrates 7 models of chilling machines and 4 models of industrial temperature testing units. Specifications and complete descriptions for each unit are furnished, as well as technical data concerning the application of the units to industrial processes. *Sub-Zero Products.*

For free copy circle No. 8 on postcard, p. 97.

Plasteel

This new cable is a preformed galvanized steel or stainless steel wire rope which is coated with strong, tough, flexible plastic which resists sunlight, oxidation, and provides excellent color stability. Full descriptions of colors and sizes currently available are described in a circular. *Macwhyte Co.*

For free copy circle No. 9 on postcard, p. 97.

Storage equipment

New ideas in space- and time-saving storage equipment are presented in a 16-page illustrated color catalog which describes racks, bins, shelves, and pallet frames for more efficient and orderly storage of countless materials. *The Frick-Gallagher Manufacturing Co.*

For free copy circle No. 10 on postcard, p. 97.

Pins and bushings

The new Flask Pin and Bushing catalog featuring standards in plain, tapered, round, hexagon, and threaded series contains the complete story of how carburized and hardened wearing surfaces and ductile cores give extremely long life to the pins and bushings. *Universal Engineering Co.*

For free copy circle No. 11 on postcard, p. 97.

Moving sidewalks

Moving rubber sidewalks, a new means of transporting large crowds of people, are discussed in an illustrated folder. It includes comments on the capacity of moving sidewalks, crowd behavior, and drawings showing a typical longitudinal section and cross section. *Link-Belt Co.*

For free copy circle No. 12 on postcard, p. 97.

FREE TECHNICAL LITERATURE

Socket screw products

A series of data sheets list the physical properties of the company's line of socket screw products. The data sheets list the ultimate tensile strength, yield point, elongation, reduction in area, and Rockwell hardness of the material from which the screws are made as well as the actual minimum breaking strength of all standard size socket screws in National coarse and fine threads. *The Bristol Co., Socket Screw Div.*

For free copy circle No. 13 on postcard, p. 97.

Utility press

The No. 2 utility press, which combines the valuable features of screw, ram, and power presses in one machine, is illustrated and described in a 4-page bulletin. This press can be used for "shearing-in" punches and dies in the toolroom, for separating punch and die holders on large liner pin die sets, etc. *The Producto Machine Co.*

For free copy circle No. 14 on postcard, p. 97.

Hydraulic oil accumulators

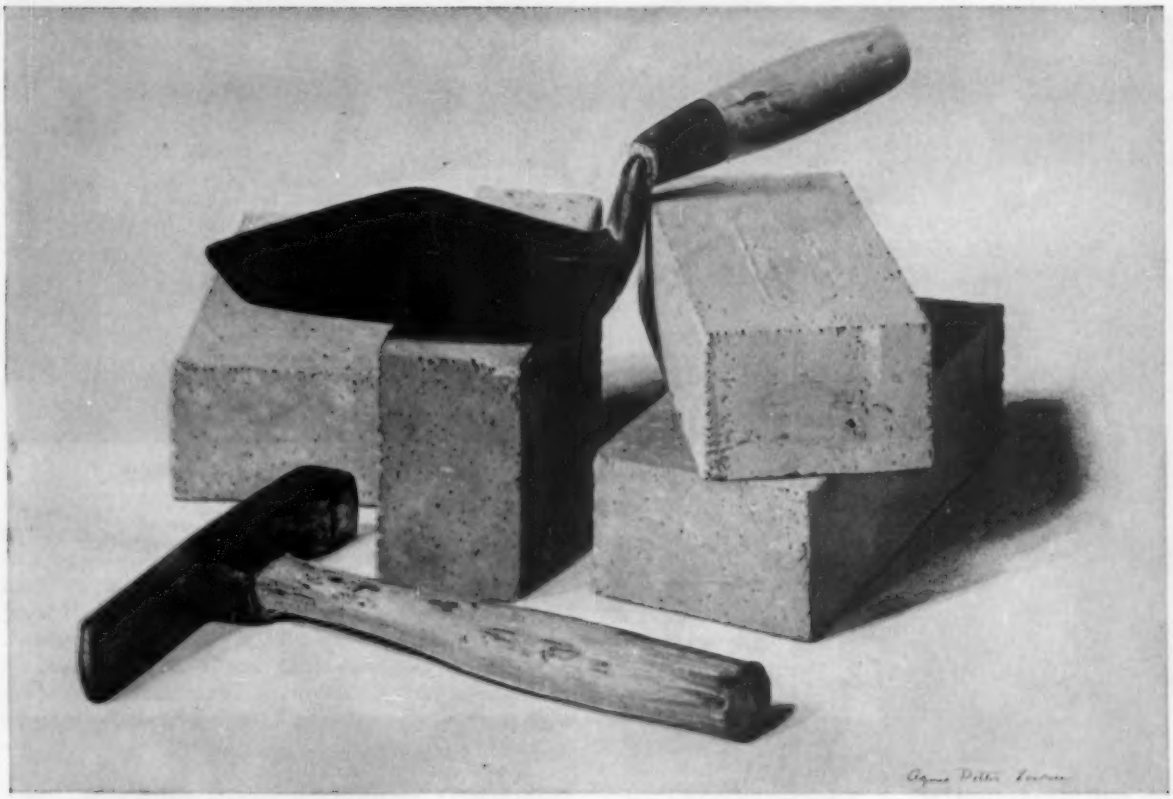
Complete information on piston-type accumulators and pre-charging accessories is offered in a catalog. The design of these accumulators makes them suitable for storing energy, absorbing shock and supplementing pump capacity in hydraulic systems on a wide variety of industrial equipment. *Industrial Hydraulics Div., Parker Appliance Co.*

For free copy circle No. 15 on postcard, p. 97.

Vibration control

Complete engineering data on improved vibration control mountings for all types of machinery is contained in a bulletin. It presents 11 different types of vibration isolating units which utilize steel springs, rubber, and cork, either singly or in combination, and shows actual installation photos of a variety of equipment. *The Korfund Co., Inc.*

For free copy circle No. 16 on postcard, p. 97.



"Lining for the Furnaces" by Agnes Potter Lowrie, famed artist daughter of a noted steelmaker. In this second of a specially commissioned series, Mrs. Lowrie captures the deceptively soft, seldom seen texture of refractory brick so rugged it can withstand months of searing 3000° temperatures . . . Limited edition of 15 x 18 color prints available. Complimentary copy sent upon request.

The Fine Art of Steel Making "II"

Whether it's building bridges or bombers, skyscrapers or pipelines . . . when America grows, it calls on steel. Year after year the industry has met the demand for more steel, better steel, faster and more efficient production. Today's speedy, almost automatic four-high mill, for instance, rolls in a single 8-hour shift more steel than the old-time hand mill produced in a week.

As the mechanics of steel making improved, so have the materials which smooth the process — Ironsides roll neck and roller bearing lubricants.

Roll neck shield, once applied by hand, is now supplied in liquid and semi-liquid form for continuous application by automatic pressure systems. Roll necks may be kept at constant temperature; the roller need not adjust his mill to maintain proper gauge.

More important, roll neck shield is formulated to the special needs of the individual user. For example, to compensate for local water and temperature conditions or to meet personal preferences of mill superintendents.

Roller bearing shield, an extreme pressure lubricant, has load-carrying capacity in excess of bearing manufacturers' standards, assuring a safety factor for peak loads. It carries the approval of all top bearing makers.

Today almost every major steel producer is a user of Ironsides lubricants. Our unique position in the industry is due to our ability to formulate for individual applications and supply those special formulas in any quantity.

We like tough problems; we've solved a lot of them. For example, Palmoshield, replacement for palm oil and most significant advance in lubrication since World War II. If you have a problem, we'd like to help lick it. A letter will summon one of our engineers. Address The Ironsides Co., Columbus 16, Ohio.

SHIELD PRODUCTS

Ironsides

By the makers of Palmoshield • "the palm tree that grows in Ohio"

Kennametal tools working in a coal mine.

OSTUCO TUBING HELPED BOOST PRODUCTION AND REDUCE DRILLING COSTS

The Problem: Various mining augers originally used with Kennametal Tungsten carbide bits were frequently replaced due to bending and twisting—particularly in hard, fast drilling. This resulted in excessive downtime, and limited potential drilling life of the Kennametal bits . . . which are capable of drilling from 4,500 to 12,000 feet.

The Solution: New Kennametal augers, manufactured from OSTUCO Seamless Steel Tubing, last the life of several bits. These tubular augers have rigidity to stand the high pressure of fast, long-hole drilling, yet are light weight for easier handling underground. Lightness, rigidity and long wear are especially important in drilling holes of 100 feet depths during mining of anthracite coal and gypsum.

Discuss your particular problems with an OSTUCO Tubing Engineer. Then take advantage of OSTUCO's convenient *Single-Source* Service and fill all your tubing needs on one order. Write or call your nearest OSTUCO Sales Office, or write OSTUCO, Shelby, Ohio.

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FREE TECHNICAL LITERATURE

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

This section starts on p. 92

Rotary embossing

Equipment and rolls for embossing sheet metals and foil are described in a 6-page brochure. Machines are built to accommodate roll faces from 7½ to 90 in. widths and are available in 5, 10, 20, 50, 100 and 175 models. Over 10,000 patterns are available through the use of matched flame-hardened forged steel rolls. *Modern Engraving & Machine Co.*

For free copy circle No. 17 on postcard.

Reamer selector

A new 20-page Comparative Reamer Selector has just been published. It contains complete dimensional data on all standard reamers, blanks and cutters, including style and net price information of their former selector. *Lavallee & Ide, Inc.*

For free copy circle No. 18 on postcard.

Chip reclamation system

Flow sheet and illustrations of the chip handling and oil reclamation system at a major automotive parts plant are shown in a leaflet. The semi-automatic system embraces chip collection, crushing, oil extraction and shipping. *National Conveyors Co., Inc.*

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Shrinking machines

Shrinking machines are made in 2 models and are described in a leaflet which contains pictures and operating facility. It also contains a description of stretching machines. *Engineering & Research Corp.*

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Iso-mite process

The Iso-mite process, which consists of combining copper and lead to produce a homogenous, fine-grained material with high lubricating value, high heat resistance, high tensile strength and the ability to withstand high pressures, is described in an interesting leaflet. *The Iso-Mite Corp.*

For free copy circle No. 21 on postcard.

Industrial equipment

A 20-page book presents the facilities available for manufacturing machinery, assemblies and subassemblies. It includes examples of the products made such as: precision grinders, drilling and lathe equipment, automatic screw machines, etc. *Crown Cork & Seal Co., Inc.*

For free copy circle No. 22 on postcard.

Industrial fluoroscopy

Three fluoroscopic methods are available for quantity inspection. General fluoroscopy, high brightness fluoroscopy and high definition fluoroscopy are described in a leaflet which includes diagrams. *Westinghouse Electric Corp.*

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Strip rolling mills

A new 8-page bulletin describes and illustrates WF 2-High, Strip Rolling Mills for both ferrous and non-ferrous operations such as breakdown, run down, planishing, tempering or skin pass rolling. *Waterbury Farrel Foundry & Machine Co.*

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Silver plating process

A 4-page booklet fully describes the features and advantages of the Sel-Rex high speed silver plating process for industrial applications. It contains valuable information including bath preparation and maintenance, a step-by-step procedure for determining metallic silver content in potassium silver cyanide, and an easy to read silver plating time table for specific thickness requirements. *Sel-Rex Precious Metals, Inc.*

For free copy circle No. 25 on postcard.

High alloy castings

Technical data and descriptive information on alloy castings to meet severe operating conditions of heat, abrasion, corrosion and erosion are contained in a brochure. Casting and machining facilities for both special composition and commercial alloys are described. *Coast Metals, Inc.*

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Damping devices

The first comprehensive book ever written on the history, design, construction and operation of damping devices has just been published. The book includes a complete description of the development and use of closed circuit diagrams and load-velocity charts for the measurement of damping device performance. *The Gabriel Co.*

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Supersolv

Information is available on Supersolv, a new granular type industrial detergent composition, which effectively removes petroleum oils and greases from both solid and porous surfaces. *Kelite Corp.*

For free copy circle No. 28 on postcard.

Threadless subplate

A 6-page brochure that includes complete engineering data and specifications on the Hupp threadless subplate for gasket-mounted hydraulic valves has just been released. *Petch Manufacturing Co.*

For free copy circle No. 29 on postcard.

FOR MORE LITERATURE
Many companies offer free literature and other information in their advertisements. For the names of these firms see the company listings in the index of advertisers.

Super-Spacers

A completely new 20-page catalog covering the 8 and 12 in. Hartford Special Super-Spacers and their accessories gives complete operating instructions, complete specifications of both the units and their accessories and pictures the units in numerous machining operations with and without the various accessories. Details and production data that is needed to put the Super-Spacers to work on a precision production or individual job basis is included. *The Hartford Special Machinery Co.*

For free copy circle No. 30 on postcard.

Mor-Grip V-Belts

Mor-Grip Fractional Horsepower and heavy duty Multiple V-Drive Belts are described in a new 24-page color catalog. Each type of V-Belt is completely described as to its construction and applications. *Maurey Manufacturing Corp.*

For free copy circle No. 31 on postcard.

Industrial heating

A new handbook designed to provide plant management and engineers with basic concepts of industrial heat processing and heat control is now available. It includes charts, diagrams and formulas. *Michigan Oven Co.*

For free copy circle No. 32 on postcard.

Engine lathes

A 16-page brochure describes the Demoor engine lathe. This beautifully illustrated brochure gives complete details, including close-up views of various components, and an explanation of controls and specifications for 10 models in the line. *Stokvis-Edera & Co., Inc.*

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ENAMELING: Step Saver

Porcelain enamel finish coat applied directly to ferrous metals with new method . . . Technique, production tested for two years, eliminates conventional ground coat and nickel flash steps.

The 40-year search by porcelain enamelers for a process that would eliminate the costly and time-consuming ground coat phase of porcelain enameling may be over.

A new material, developed by Parker Rust Proof Co., is the key to a new method which allows the application of the porcelain enamel finish coat directly to ferrous metals.

Production Tested

Called Parker Pre-Namel 410, the material has been production tested for the past 2 years with the cooperation of Frigidaire Div. of General Motors in their Dayton plant. Also collaborating in the field development has been Pemco Corp., Baltimore, a leading manufacturer of frit.

The new method has demonstrated that it delivers improved physical characteristics of the finished product, with important reduction in costs through by-passing the conventional ground coat and nickel flash steps.

Here Are the Results

In exhaustive tests the special metal treatment provided by the Pre-Namel 410 process has produced: (1) Reduction of coating thickness with consequent reduction of damage from torsion and cross - bending. (2) Straighter parts with less bowing between front and back sides. (3) An indication of fewer rejects. (4) A reduction of the number and types of enamel frits required.

Tests conducted by Parker, in cooperation with Frigidaire and Pemco indicate that the process eliminates the need for a special premium base metal; applies successfully to cold rolled rimmed steel and enameling iron; permits application of standard finish coat porcelain enamels direct to steel; produces completed parts meeting the best acceptance tests for standard porcelain enamel.

Torsion tests, one of the standard tests of the Porcelain Enamel Institute, show these average results: Conventional ground coat plus finish coat porcelain enamel on enameling iron angles fail when the metal is twisted 65° to 80°. In contrast, one finish coat of porcelain enamel, applied over Parker Pre-Namel 410 on the same base metal withstands 3 to 3½ times more twist on the torsion test.

WANT MORE DATA?
You may secure additional information on any item briefed in this section by using the reply card on page 97. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

Methods:

Unitize aluminum ingots to simplify handling.

Banding aluminum ingots together in unit packages has simplified handling and storage in the plant of Aluminum Co. of Canada and at customers' plants.

The aluminum ingots are about 6 in. wide at the bottom, 32 in. long and weigh about 50 lb. Strapped units contain 41 ingots and weigh around 2000 lb. The bottom layer of the unit contains six ingots. Five rows of seven ingots nested together are stacked on top of it.

Individual units are easily moved by lift truck to either the

warehouse area or freight cars. Units are loaded in three rows four deep and two high in each end of the box car. Each half car unit weighs about 50,000 lb and is securely braced with Acme Steel Unit-Load Band.

Some shipments go directly by rail to customers in the United States. Others go to the company's dock facilities at Quebec.

Testing:

New ramjet laboratory ready for use.

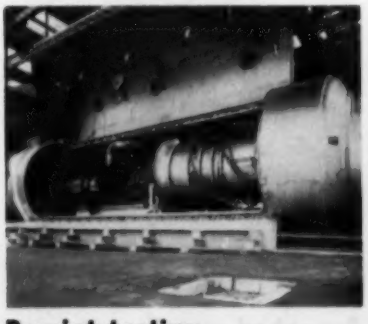
One of the largest privately operated supersonic, high-altitude laboratories in the United States for the development and production testing of ramjet engines has been put in operation by Wright Aeronautical Div. of the Curtiss-Wright Corp.

Ramjet engines are very high-speed power plants which burn fuel and obtain the large amounts of oxygen necessary for combustion through a front inlet into which air is rammed by the fast forward speed of the engine and aircraft.

Speeds to 3500 mph Plus

Ramjets are best suited to speeds of 1500 to more than 3500 miles an hour at sea level. The new laboratory, which cost $7.7 million, was designed by Curtiss-Wright engineers and was built under sponsorship of the U. S. Air Force.

The new addition to the company's test facilities will greatly enlarge the field in which the company can do active development work and will aid in achieving more powerful engines.



Ramjet testing . . .

Broaching:

Method simplifies production, cuts part costs.

Broaching for production metal removal can net a return of anywhere from five to 20:1 over a good many machining operations. It also can shift a slow job into high "gear" production, and reduce the number of inspection operations necessary.

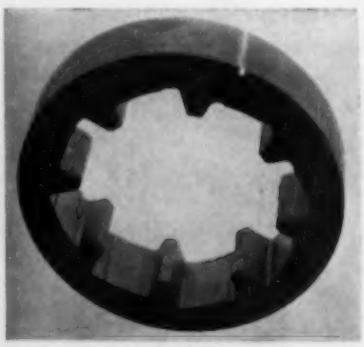
For these reasons, broaching operations are being used more and more widely in metalworking plants, according to W. M. Reid, who guides special broach-making operations at Acar Broach Co., Detroit.

Yields Fine Finish

Intricacy of the part to be broached is not a deterrent in applying a broach on a job. If there is clearance for a broach to make its pass, it is possible to take advantage of production economies offered by this method of metal removal.

Finishing an over-running clutch for one of the large automotive makers is one example. The problem was to produce internal finishes of around 20 to 30 microinches. Formerly 60 microinches was the best that could be attained, and the company was seeking a different method of grinding than the one being used.

The application of a short finishing broach on the job not only produced finishes better than called for by the specifications, but also increased production time several hundred percent.



Broached clutch part . . .

New Books:

"Shop Theory," revised by Fred Nicholson. An up-to-date, completely revised edition of the popular Henry Ford Trade School text. It covers basic shop equipment, from small hand tools to metalworking machinery, and describes their practical application. New tools and machines are introduced in many chapters, together with supplementary illustrations.

The text makes extensive use of an easy-to-understand question and answer technique for clarity in describing common tools and processes. Includes a valuable correlated list of the latest visual aids available from many sources. McGraw-Hill Book Co., Inc., 330 W. 42 St., New York 36. $4.48. 329 p.

"Radio Interference Suppression Techniques," PB 111611. Office of Technical Services, U. S. Department of Commerce, Washington 25. $6.75. 270 p.

"Reference Tables for Thermocouples," National Bureau of Standards Circular 561. Government Printing Office, Washington 25. 50¢. 84 p.

"Trademark Management — A guide for Businessmen." Sets forth the complex policies with respect to all phases of handling a company's trademarks. Based on 3 years of research by a special committee of the United States Trademark Assn. and reflects the policies of more than 50 pct of the members of this group. The United States Trademark Assn. 522 Fifth Ave., New York 36. $5.00.

"The Family Of Man" by Edward Steichen. A rewarding anthology of great photographs. Maco Magazine Corp., 480 Lexington Ave., New York. $1.00. 192 p.

PB 111608, A new army report comparing heavy grease and volatile corrosion inhibitors as metal preservatives. Office of Technical Services, U. S. Dept. of Commerce, Washington. $1.00.

FOUNDRY: New Core Binder Developed

Synthetic resin core binding material yields high strength cores with better collapsibility . . . No curing or chemical action during baking of core . . . Successfully tested on limited commercial basis.

Substantial reductions in the cost of high quality metal castings are claimed through use of a new type sand core binding material entirely different from any product previously marketed to the foundry industry.

Several Advantages Offered

Called Good-rite CB-35, the new synthetic resin is the result of 5 years' intensive development by B. F. Goodrich Chemical Co. with the co-operation of a leading school of metallurgy, research scientists, and practical foundrymen.

Several specific advantages over materials currently in use, particularly in the areas of baking, gas formation, collapsibility, and resistance to "over baking" are offered by the CB-35 core binder, the company claims. For the past two-and-a-half years, the material has been successfully used on a limited commercial basis in selected Ohio foundries.

Unlike many resins, no curing or chemical action occurs during the baking of a core containing CB-35. Baking is complete when the water contained in the mix has been removed. Tolerance for "over baking" is excellent with maximum baked physical properties obtained over a wide range of time and temperature conditions.

No Cereal Required

With the use of CB-35, only a fraction of the gas volume evolved from other core binding materials is produced. Since the use of cereal is not required, noxious gases are minimized. High strength cores based on CB-35 demonstrate better collapsibility than can be realized with other binders.

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 97. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

Tubing:

Company diversifies line of precision tubing.

Tubing which is first cold finished by the tube reducing process and then further drawn to obtain improved surface, closer tolerances and better mechanical properties will soon be produced in expanded facilities of the Tube Reducing Corp., Wallington, N. J.

The new Rockdrawn tubing will be produced in outside diameters from ⅛ to 1⅛ in. to customer specification. Tubing is already produced by the tube reducing process alone in sizes from ⅞ to 5¾ in. In addition a new plant has been recently completed to provide compression formed tubing to 17 in. OD.

To make equipment more dependable, use C-D-F electrical insulation!

The reliable operation and long life of heavy electrical equipment often depends on insulating parts. A good supplier of insulation draws from past experience to make this possible—C-D-F has been a recognized industry leader since 1895! A good supplier expands his research and technical skill consistently—C-D-F offers the *widest range of electrical insulating materials*, from Vulcanized Fibre to C-D-F Products of Teflon.*

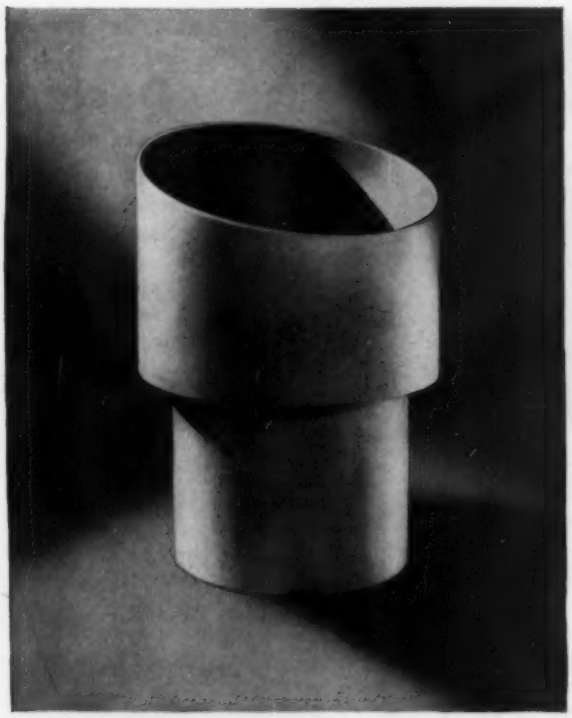
A BIG, RELIABLE SOURCE OF SUPPLY

As a designer or user of electrical equipment, you gain when your manufacturers work with C-D-F. Quality and dependability of electrical insulation, at reasonable cost, are guaranteed. The latest technical advances and ideas can flow freely between you and C-D-F's engineers. This page shows only a few of the many products C-D-F makes and fabricates for the electrical industry. Consult Sweet's Design File for catalog information, or call your C-D-F sales engineer (sales offices in principal cities)—you'll find he's a good man to know!

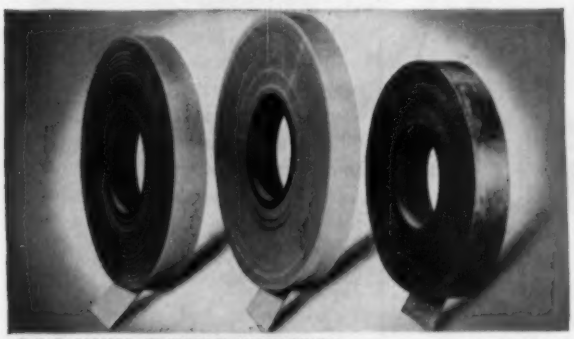
*DuPont Trademark

CDF Continental-Diamond Fibre

CONTINENTAL-DIAMOND FIBRE DIVISION OF THE BUDD COMPANY, INC.
NEWARK . DELAWARE

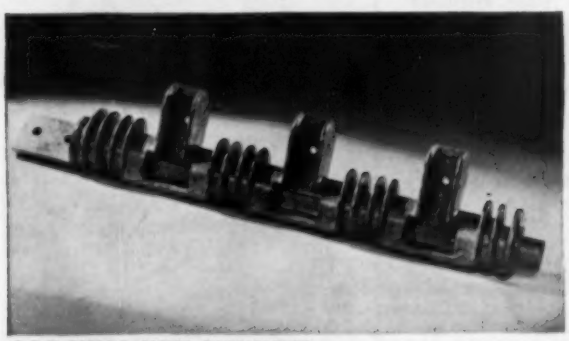


C-D-F HANDLES THE COMPLETE JOB An oil circuit breaker component is made from two Dilecto laminated plastic tubes, with a threaded ring joining the assembly. From raw materials to finish machining C-D-F does it all!



C-D-F MAKES FLEXIBLE INSULATION To meet critical high heat and electrical insulating needs, C-D-F makes these efficient, easy-to-apply tapes. Size range is wide, with latest resins and backing materials used. Write for samples and technical bulletins of Silicone, Teflon, and Micabond tapes.

C-D-F UNDERSTANDS THE ELECTRICAL INDUSTRY'S NEEDS Precisely machined to close tolerances, Dilecto panel boards guarantee dependable insulation, help designers save space. New 1955 Dilecto catalog is yours for the asking, lists all new grades.



C-D-F MOLDS MANY SPECIALTIES This shaft insulator for a circuit breaker is molded from C-D-F's cloth-based industrial thermosetting plastic, Celoron. Note complexity of mold, clean detailing. Celoron has high impact strength, is used in switchgear.

C-D-F GIVES YOU BETTER MOTOR AND GENERATOR INSULATION All these built-up and bonded mica products are made by C-D-F to provide uniform high-heat resistance and dielectric strength. All forms of Micabond are made for better performance and lower costs.

Design:

Epoxy potting adds life to high speed armature.

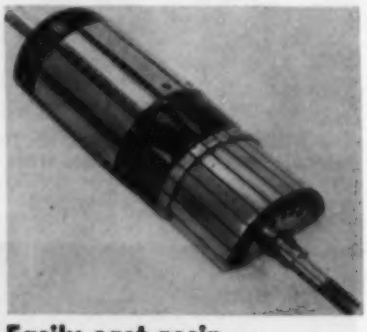
Electrical failures under excessive vibration and high and low working temperatures were stopped when a direct current motor armature was encased by one company in epoxy resins.

Used in a special military aircraft compressor made by McCulloch Motors Corp. of Los Angeles, the Bakelite epoxy resin compound holds wires and split ring contact rigidly in position as the armature spring spins at 8000 rpm. Ambient temperature ranges from a high of 165° F to a low of −65° F with parts reaching a temperature as high as 400° F.

Strong, Moisture Resistant

Previous compressor motors failed because of armature insulation breakdown at the elevated temperature under high vibrational load.

Excellent electrical properties and mechanical strength of the epoxy resins provided reliable service under these conditions. Their outstanding chemical and moisture resistance help combat moisture penetration and corrosion



Easily cast resin . . .

Gives added protection . . .

ALWAYS FINISHES FIRST

—and saves on compound—it's "metered"!

Liquimatic®

the perfect liquid compound for all metal finishing

How much of the compound in your buffing room is wasted... in the nubbin pile, or in "over-heading" buffs? There's a way to "meter" the compound you use—the Liquimatic way. An electrically timed system in the Liquimatic Process feeds the exact amount of liquid compound for the exact cut you need. While compound is being saved, buffs are being saved too ...continual lubrication extends buff life up to 400%.

These two cost-saving advantages alone soon pay for a complete Liquimatic Application System. But there are still other ways Liquimatic will help you cut costs. No hand application, and no changing of bars will effect substantial down-time savings for you... and Liquimatic's ease of cleaning means even further economies. Now—when production must be upped, and costs lowered – profit from Liquimatic—over and over again.

Check the other features of Liquimatic ...then write today for your free copy of Liquimatic's big, new folder that tells the whole cost-saving story of Liquimatic in *your* buffing room.

Liquimatic ...

gives more buff mileage

These additional Liquimatic features mean real savings in terms of time, money, safety—

- longer buff life
- completely automatic
- fast cutting
- easy cleaning
- non-settling
- high flash point
- long storage life
- sprayable viscosity
- adhesive slow-wearing buff face

1437

PLATEMANSHIP

Your H-VW-M combination—of the most modern testing and development laboratory—of over 80 years experience in every phase of plating and polishing—of a complete equipment, process and supply line for every need.

HANSON-VAN WINKLE-MUNNING COMPANY

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H-VW-M

INDUSTRY'S WORKSHOP FOR THE FINEST IN PLATING AND POLISHING PROCESSES • EQUIPMENT • SUPPLIES

Easily cast at low or room temperatures without applying pressure . . .

by salt water and jet engine oils to which the armature is also exposed.

Cast At Room Temperatures

With the armature operating at 28v dc, this special aircraft compressor delivers 3000 psi pressure. The 35-lb compressor has an outside diameter of 9½ in. and an overall height of 16½ in. Easily cast at low or room temperatures without applying pressure, the epoxy resin compounds cure rapidly with very little shrinkage.

Before hardening, the thin potting compound penetrates between closely wound wires and takes a stubborn grip on metal, glass, ceramic, as well as most other surfaces.

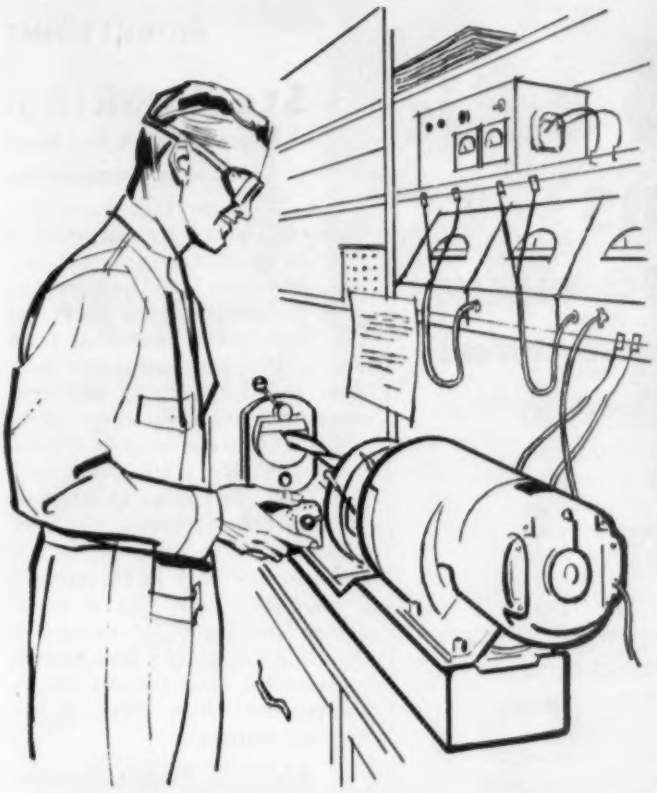
Alloy:

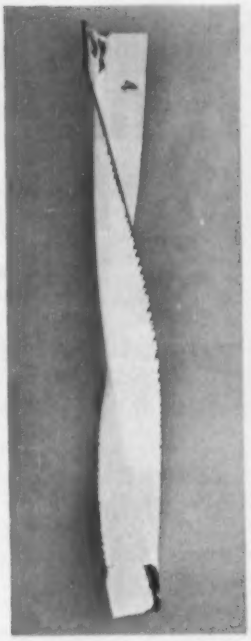
New bronze valve seat metal has long life.

A lifetime seating material for bronze valves, Brinalloy, has been developed by The Lunkenheimer Co. of Cincinnati. The metal is an alloy of nickel, chromium, and silicon. In 3 years of field tests, conducted with the cooperation of nearly 100 leading industrial valve users, Brinalloy has set an entirely new standard of performance for bronze valve seats and disks.

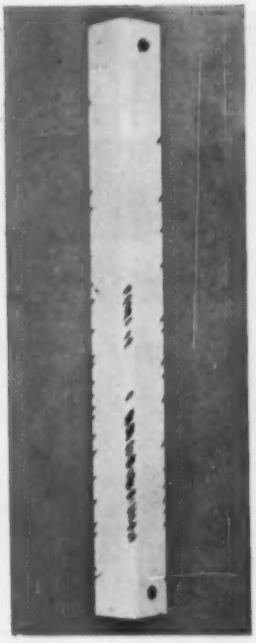
During the 3-year testing program, Brinalloy seats and disks were used in dozens of the most severe bronze valve services found in more than a score of different industries.

The metal's long life—even in installations where other seating materials failed regularly in 2 weeks to 3 months—has eliminated the need for renewing, regrinding, or replacing seats and disks during the entire life of the valve. The metal, not a plate or case is hard all the way through.





Enameling iron, with 1 coat of porcelain enamel over Parker Pre-Namel 410, was twisted 255° before enamel fractured.



Enameling iron, with conventional 2-coat system of porcelain enamel, fractured badly when twisted only 70°. (Twisted less than its elastic limit, metal returned to its original shape).

NEWS OF A REVOLUTION

that's about to happen!

Porcelain enameling on steel has always been a preferred finish. However, its use has been limited by cost and by difficulties in the processing.

Now, a big change is about to take place. It is coming about through a cooperative effort that we feel should be acknowledged.

First, Parker Rust Proof Company's research discovered and developed a surface treatment for steel which permits the application of the porcelain enamel finish coat directly to ferrous metals, reduces cost, improves quality and eliminates many production difficulties in porcelain enameling. For production evaluation, Frigidaire Division of General Motors and Pemco Corporation entered the effort with pilot runs and production tests.

The new treatment, making use of Parker Pre-Namel 410, has been shown to simplify porcelain enameling, achieve high quality uniform results, reduce use of frit, produce a more durable finish. Savings of from 1 to 3 cents per square foot of enameling surface are indicated.

We gratefully acknowledge the help we've had from Frigidaire and Pemco. Here is another instance of companies in diverse lines cooperating in a development program today which should benefit hundreds of manufacturers and millions of their customers in the future.

**Bonderite, Bonderlube, Parco, Parco Lubrite, Parker Pre-Namel—Reg. U.S. Pat. Off.*

Since 1915—Leader in the Field

1915 40th year 1955

PARKER RUST PROOF COMPANY

2186 E. Milwaukee, Detroit 11, Michigan

BONDERITE	BONDERITE and BONDERLUBE	PARCO COMPOUND	PARCO LUBRITE	TROPICAL
corrosion resistant paint base	aids in cold forming of metals	rust resistant	wear resistant for friction surfaces	heavy duty maintenance paints since 1883

Steelmaking:

Improved arch has good record in openhearths.

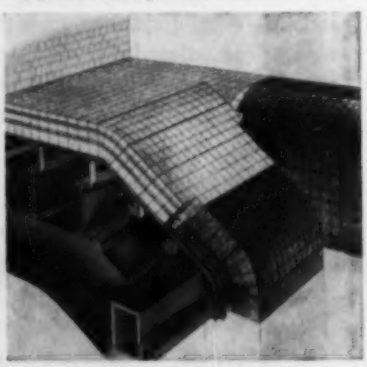
An unusual interchangeable type arch, tested for more than a year in heavy duty steel mill service, has been developed by Laclede-Christy Div. of H. K. Porter Co., Inc. Service records of from 850 to 1000 heat campaigns have been recorded for this new construction by openhearth operators.

Basic tile (magnesite or chrome magnesite) is used to resist erosion from basic slags in steelmill openhearths. Since it is relatively expensive, it is desirable to use this material only in the critical areas. Basic tile has a much higher coefficient of expansion than clay tile, hence a very flexible construction must be provided to accommodate both types of refractory material.

Design Features

Some of the features of this design are:

1. Adequate provision for expansion and/or growth of tile during heating up and continued service in the furnace.
2. Ease of installation. Lug castings engage the tile on the bed joints. Heavy shelf castings prevent cumulative load.
3. Tongues and grooves in clay tile hold mortar in place and provide better seal.
4. Steel encased basic tile with corrugated steel strips in expansion joints provide room for expansion and seal the joints.
5. Minimum number of tile shapes are required.



Interchangeable arch . . .

This C-51 deseaming blowpipe opens transverse plate welds in steel barge bottoms 7 times faster than the previously used process.

Barges get new lease on life...

FOR 70% LESS COST

Deseaming blowpipes have cut the time required to remove these steel barge bottoms from 4 days per barge, to only 1½—and cut costs $500 per barge....

In this operation, the barges were rolled over in the water. Bottom plates were deseamed and removed, and then new plates UNIONMELT welded in position. Before removing the old plates, it was necessary to "open" seam welds, plug welds, and rivets. The deseaming blowpipes did this work with maximum speed and economy—and with minimum nicking into the support members beneath the plates.

Deseaming blowpipes operate with a low-velocity oxygen stream, and make a wide pass in metal at high speeds. The depth of penetration is controlled by regulating oxygen pressure. Lightweight, easy to handle deseaming blowpipes are speeding production and repair operations throughout industry.

For more information on this or any other of LINDE's modern, money saving processes, call your local LINDE representative. Start saving now, call him today.

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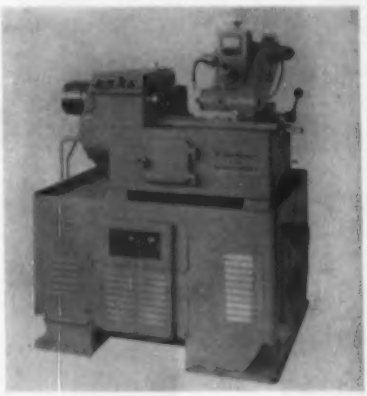
NEW EQUIPMENT

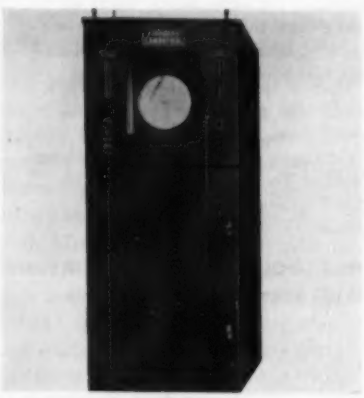
New and improved production ideas, equipment, services and methods described here offer production economies . . . for more data use the free postcard on page 97 or 98

Semi-automatic thread miller has hydraulic operation

New 4 x 9 in. thread milling machine to be introduced at the Machine Tool Show is completely hydraulic in operation, including pump and hydraulic motors for actuating work head and cutter head. The hydraulic feature permits balancing cutter speed and work speed, plus rapid traverse, thus producing optimum cutting conditions for the work involved. Spindle speeds are infinitely variable within normal cutting range to facilitate machining of unusual alloys. The standard machine is available with internal or external cutter head and will produce internal or external, straight or tapered threads up to 4 in. diam, 9 in. from collet nose. Once set up, the machine is semi-automatic in operation and all controls are easily accessible to the operator. Lead and cross-feed cams are interchangeable. *Hanson-Whitney Co.*

For more data circle No. 34 on postcard, p. 97.





Controls carbon potential of furnace atmospheres

New automatic controlling, recording, and proportioning instrument enables the heat treater to set his atmosphere generator or furnace in equilibrium with any steel to be heat treated. The Carbotrol makes automatic control of furnace atmosphere as simple as automatic temperature control of the furnace. The heat treater sets the pointer on the control instrument for the carbon content of the steel to be treated and the Carbotrol will automatically control the atmosphere generator to produce the required protective atmosphere. Air-gas ratio of the generator is automatically corrected to produce a constant dew point, or carbon potential, as the raw gas supply and pressure vary. Range of control is 0.30 to 1.5 pct carbon; dew point, +70° to −5°F. Controls Endothermic generator gases. *Lindberg Engineering Co.*

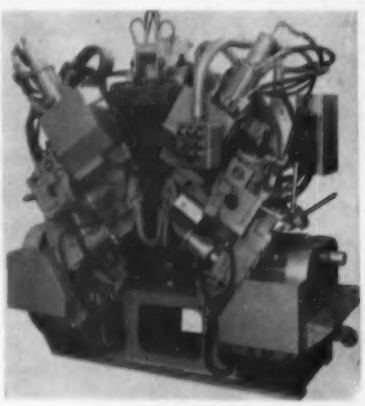
For more data circle No. 35 on postcard, p. 97.

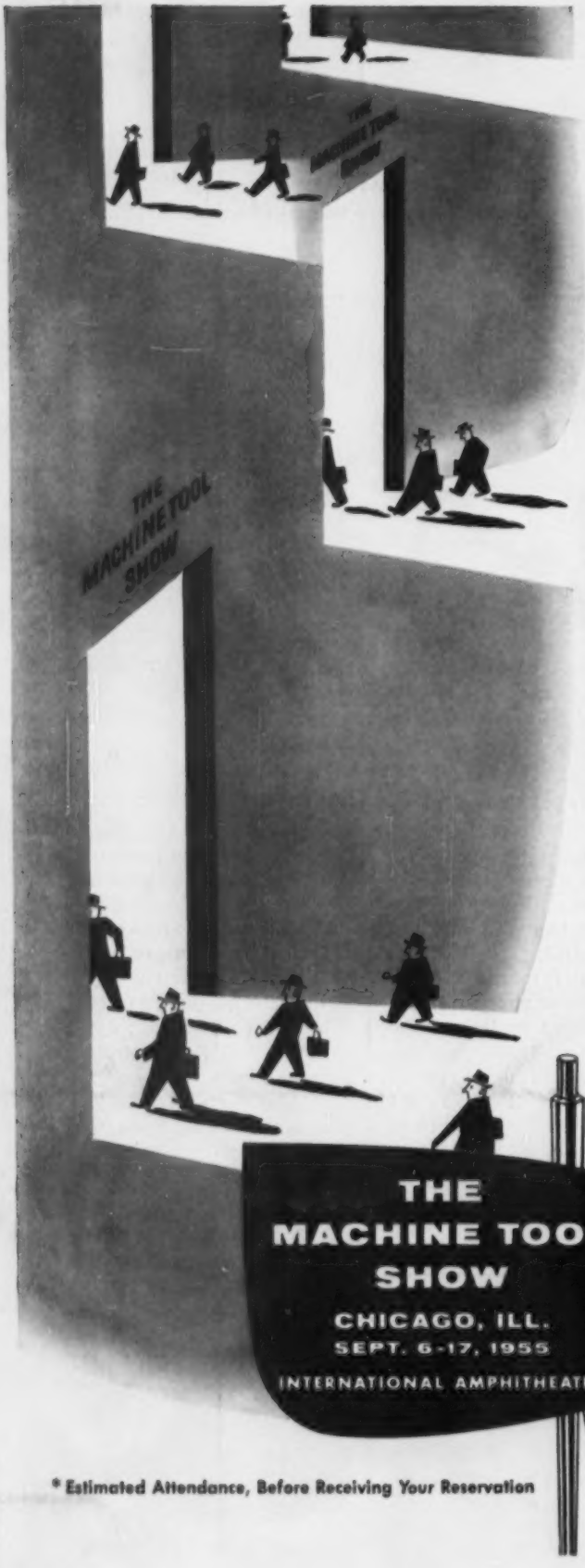
Double end welder for transmission bands

Production time and costs are cut with a new double end welder that simultaneously joins both ends of a strip of steel to a forging to make automatic transmission bands for automobiles. Flash-butt welding of rolled steel band stock to high strength forgings produces low cost bands of lasting strength. Welding both ends at once cuts prouction costs even more. Welds are of the same cross-section as the band since resistance flash-butt welding produces a 100 pct efficient joint. No special preparation of the forging is necessary for making the joint. After welding joints are broached free of flash, the forging is severed between its bosses and machined to complete the band. The double end welder is adjustable for many band sizes and forging shapes. *Taylor-Winfield Corp.*

For more data circle No. 36 on postcard, p. 97.

Turn Page





17,032*

General Managers looking for BETTER METHODS!

Plan *now* to join them—at the Machine Tool Show. You'll find a wealth of answers to each of your metalworking problems. More than ninety per cent of the country's leading machine tool builders will be on hand, ready to show you their newest models, their fastest, most ingenious, most economical production methods.

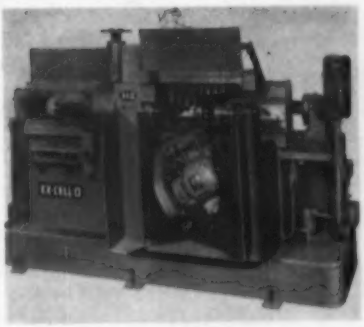
It's the largest and most important show of its kind; one you can't afford to miss. The last time it was held, in 1947, all attendance records were broken—and this time even greater crowds are expected. The Production Engineering Show, being held on the Navy Pier, in Chicago, on the same dates, offers a bonus attraction that's hard to beat; a chance to see the latest in machine tool accessories at no additional cost. The same badge will admit you to both shows.

Bring your key production people to Chicago in September; share with them this unequaled opportunity to see the latest developments in machine tools. The 1955 Machine Tool Show is the best chance you've ever had to see **the world's best investment**—***in action!***

NATIONAL MACHINE TOOL BUILDERS' ASSOCIATION
2071 East 102 Street • Cleveland 6, Ohio

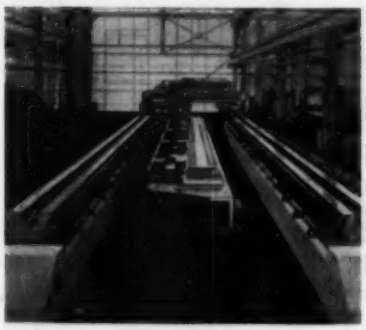
*** Estimated Attendance, Before Receiving Your Reservation**

Blade profiling machines for the aviation industry



Two new and larger profiling machines for milling and grinding, respectively, the air foils of forged jet engine compressor blades accommodate blades having airfoils up to 6 in. wide x 18 in. long. Style 186 precision profile miller has a precision milling spindle with its drive motor mounted on an angular slide on the front of the machine base. It is currently being used on titanium as well as stainless steel. The work feeds lengthwise across the milling cutter, and indexes radially after each cutting stroke. Relative position of blade to cutter is cam controlled. The grinder is similar in appearance but the blade rotates and feeds across the wheel in the grinder. Work is automatic. *Ex-Cell-O Corp.*

For more data circle No. 37 on postcard, p. 97.



Gantry mill has work capacity of 17 x 70 feet

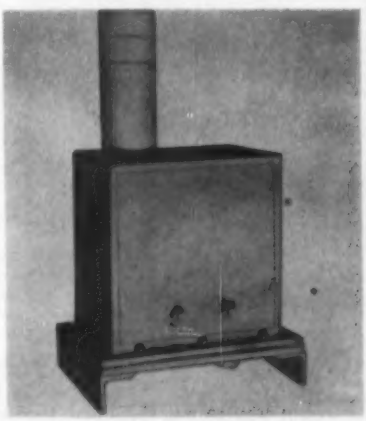
Huge gantry-type milling machine with work capacity of 17 x 70 foot is capable of taking a cut from the top of a boxcar-size casting with room to spare. The machine is hydraulically - driven, equipped with a Portland-built power pack and a 50 hp Portland heavy duty milling head. Hydraulic pressure equalizing system, tracer controlled, prevents seesawing in the longitudinal travel of the rail along the ways. An equalizing system, embodied in the rail, insures accuracy of 0.002 in parallelism throughout the 70 ft length of the ways. A further effect of the system is said to assure an extremely fine finish, showing relatively few feed marks in the work. *Portland Machine Tool Works.*

For more data circle No. 38 on postcard, p. 97.

Actuates devices in high temperature operations

The glow of a cigarette at a distance of 10 ft will actuate the Infra-ray relay, it is reported. This rugged, highly sensitive electronic device can be used to actuate at a safe distance any device associated with high temperature operations. It turns on cooling sprays; actuates hot strip coilers; operates hot rolled rod receiving equipment; and stops pouring of molten metal at the correct level. It will activate recorders of high temperature instruments; sounds safety signals when hot material is in motion; stops it at the right location on cooling beds. The unit provides relay action brought out to three terminals: common, normally-closed, and normally-open. Maximum contact ratings are not more than 250 v amp, rms, at any time; not more than 5 amp immediately prior to opening; not more than 500 v immediately prior to closing. Cabinet is 9 x 12 x 6 in. *Industrial Gauges Corp.*

For more data circle No. 39 on postcard, p. 97.



Shell core blower for high-speed production

Features of new shell core blowers include adjustable piston stroke on the core box opening mechanism and an enlarged blowhead opening to permit blowing into cavities located within an area of 11 x 4 in. The blowhead itself has been increased in size to contain 100 lb of sand and resin. The core box remains intact against electrically heated cast iron plates throughout the entire investment and curing cycle. No ovens are used, either externally or within the machine. Cores are cured and ready to set when removed from the core box. Production cycle is 30 to 50 sec, permitting an output of 70 to 100 cycles per hr multiplied by the number of cavities in the core box. *Shalco Engineering Corp.*

For more data circle No. 40 on postcard, p. 97.

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Roller bearing

New cartridge roller bearing is housed in a flexible neoprene housing. Called the Rollway Flexi-Flange, the bearing is installed with only the aid of hand drill and wrench. It operates almost dust-free, and is said to have excellent load-carrying characteristics and

allows for alignment of shafts. Shaft limits for the new bearing are ½ to 1 7/16 in. The ½-in. size supports a radial load of 415 lb at 100 rpm; at the same rpm, the 1 7/16 in. size has maximum capacity of 1665 lb. The bearing is designed for use on farm and industrial materials handling equipment. *Rollway Bearing Co.*

For more data circle No. 41 on postcard, p. 97.

Thickness tester

This non-destructive thickness tester will test thicknesses of metals deposited on metals, metals on non-conductors, and non-conductors on metals. It gives readings of thicknesses of virtually

any coating on any base it is stated. Thicknesses are read directly from the instrument and are determined in a matter of seconds. The electronic unit is compact and portable, permitting use in almost any location. *Unit Process Assemblies, Inc.*

For more data circle No. 42 on postcard, p. 97.

Turn Page

You start to save money with the first American Phillips Screw driven in your assembly departments. And your savings multiply from then on. No waste motion, less fatigue. No screws dropped or lost. No backing out and re-driving . . . because American Phillips Screws *drive straight automatically*. No broken screwheads. No gouged work-surfaces . . . because the 4-winged driver can't slip out to rip and scar. Now add up all these savings, and you come out as much as 50% ahead of old-fashioned fastening methods.

Next — add up all the advantages of buying *American* . . . still the first-choice source for Phillips Screws. American's capacity, unmatched experience, and *engineering pioneering* mean that you have a top supplier that you can always bank on to keep your production rolling. Yes, you lift a load off your mind when you buy American. Let's talk it over . . . *any time you say.*

✕ *marks the spot . . . the mark of extra quality*

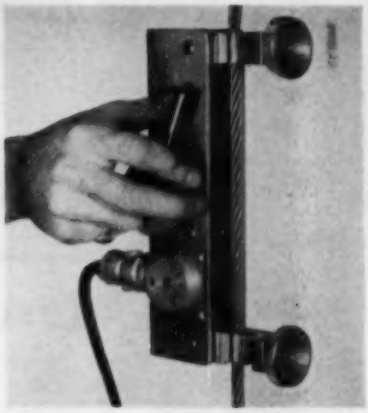
AMERICAN SCREW CO.

PHILLIPS HEADquarters
WILLIMANTIC, CONNECTICUT

Plants at Willimantic, Conn. and at Norristown, Pa.
Warehouse and office at Chicago
Office, Detroit, Michigan

Measures wire tension

For measuring tension in wire rope, an SR-4 Tensiometer is based on the electrical principles of the SR-4 resistance wire strain gage. The instrument senses the force required to deflect the cable be-

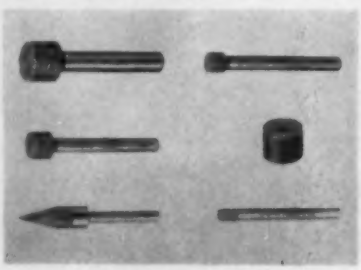


tween clamps. It was developed primarily for checking and adjusting cable loads, especially when a load is distributed among several cables. Designed for loads up to 5000 lb on cables up to ½ in. diam, it can be made for other sizes and types of cables. *Baldwin-Lima-Hamilton Corp.*

For more data circle No. 43 on postcard, p. 97.

Diamond wheels

Vinoy diamond impregnated wheels contain crushed diamonds imbedded in a special carbide matrix. These tools are designed primarily for the carbide die indus-



try for grinding carbide dies, bushings, etc.; may also be used on other hardened materials such as nitrided or case hardened steels. Wheels are available in 60 to 200 diamond mesh. *Diamond Products, Inc.*

For more data circle No. 44 on postcard, p. 97.

Turn Page

Walkie truck has load-scale attachment

Lowlift platform type walkie truck equipped with a load-scale attachment shows the operator the weight of the load the instant it is picked up for transporting. The load-scale can be used to give proper floor load distribution and to prevent elevator overloads. The Jacklift Electric is ideal for narrow aisle operation. All controls are located in the handle head of the truck; truck operates with handle in any position, including vertical. Capacities to 6000 lb; front width 32 in. Platform width 25 in. x 30 to 72 in. long. Vertical lift is 4 in. *Lewis-Shepard Products, Inc.*

For more data circle No. 45 on postcard, p. 97.

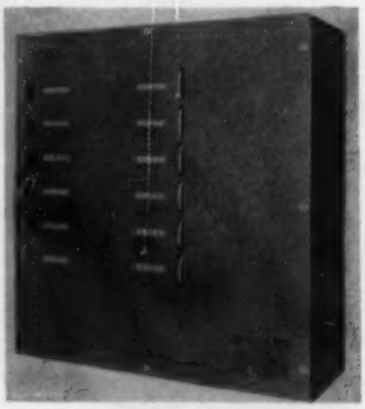
Colored aluminum strip

Continuously anodized and dyed aluminum strip in coils is available. The continuous anodizing process provides a non-tarnishing finish, which is consistent and uniform throughout the coil, with no visible electrode contact marks. Roll forming and stamping operations are also simplified, since the coils are adaptable to automatic feed. The new metal is dyed in many colors including gold or brass tones. Is available in commercial coils in gage ranges from 0.003 to 0.020 in. and widths from ¾ to 20 in. *Fromson Orban Co., Inc.*

For more data circle No. 46 on postcard, p. 97.

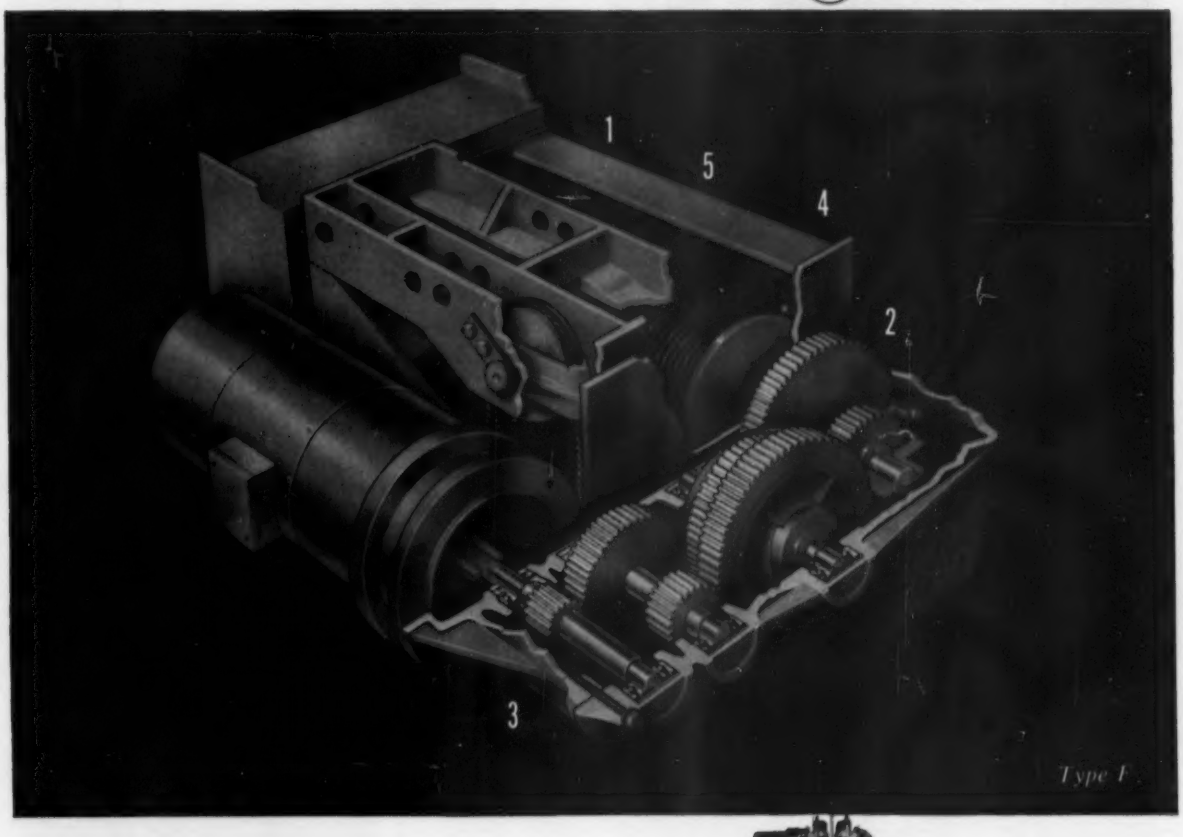
Converts weight readings

A totalizer converts weight readings of a dial scale to digital equivalents. Remotely controlled, the totalizer can be used as a control in receiving or shipping and processing material through an automatic hopper scale that is connected to a dial scale. The unit will give a continuous running total-weight of batches discharged by the hopper scale. *Richardson Scale Co.*



For more data circle No. 47 on postcard, p. 97.

Turn Page



HOW "PATH OF STEEL" CONSTRUCTION SAVES YOU MONEY

Lift and move loads up to ten tons—and spend less on repairs, less on maintenance—with the lasting extra strength of Robbins & Myers' *all steel* "F" Hoists.

Check these points—from trolley to hook—

1. Electrically *welded steel frames,* solidly braced.
2. *Alloy steel* gears.
3. *Alloy steel* shafts, with ultimate tensile strength of 278,000 lbs. psi.
4. Drums of *heavy steel* pipe, with *steel* flanges, or, in larger models, of *solid* castings.
5. *Plow steel* wire rope, pre-formed, with 6 x 37 stranding, lubricated hemp center—extra flexible, extra strong.
6. *Steel* casting hook block, drop forged *steel* hook.

Send for full specifications—no obligation.

Bring your R & M hoist data files up to date. Send for free bulletin.

☐ Send Bulletin No. 801C ☐ Have Representative call

VENTILATORS MOYNO PUMPS HOISTS CRANES MOTORS FANS

ROBBINS & MYERS INC.

SPRINGFIELD, OHIO BRANTFORD, ONTARIO

Spot checks temperatures

Portable pyrometer employs new method for surface temperature measurement with high accuracy. The Land Surface Pyrometer is suitable for measuring spot temperatures in a range from 100° to 2400°F, and may be used for oxidized steel or cast iron, many oxidized nonferrous metals, painted

surfaces and others, regardless of their emissivity. Illustration shows an engineer sampling temperature of hot steel billet. Instrument head, mounted on telescopic pole, is applied to hot body. Accurate temperature is given 5 sec later on milli-voltmeter calibrated in degrees. *Fielden Instrument Div., Robertshaw-Fulton Controls Co.*

For more data circle No. 48 on postcard, p. 97.

Gearless drill heads

New series of In-Line drill heads is for drilling, tapping or reaming holes in a straight line in an elongated pattern. Any diameter in any machinable material as close as the sum of the two smallest hole diameters can be drilled, reamed or tapped. In-Line Series capacities are holes arranged in a straight line 13, 15, and 26 in. long. Drill sizes are ⅛ to ¾ in. New plastic demonstrator revealing gearless technique is offered to those requesting on letterheads. *Zagar Tool, Inc.*

For more data circle No. 49 on postcard, p. 97.

Turn Page

Leak detector

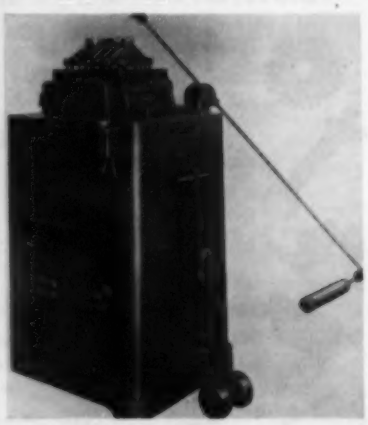
Mass spectrometer leak detector is smaller, easier to maintain and four times more sensitive than its predecessor. Type M-1 is designed to detect a leak rate of 5 x 10^{-10} standard cc of air per sec entering

an evacuated system under atmospheric pressure. It can be used selectively to locate a specific leak in the presence of other leaks, without loss of sensitivity, and 20 sensitivity ranges make it possible to locate leaks of different sizes. *General Electric Co.*

For more data circle No. 50 on postcard, p. 97.

Stock straighteners

For plant press rooms, motorized stock straighteners are available with compact, one unit drives having either constant or variable speeds. A variety of sizes make



stock in widths from 2½ up to 12 in. and with 5, 7 or 9 straightening rolls. Units may be operated intermittently for feeding coil stock or continuously for straightening short lengths of stock or finished parts. *Cooper Weymouth, Inc.*

For more data circle No. 51 on postcard, p. 97.

STAINLESS CURTAIN WALLS

give you the best "long pull" investment

"INFO" for Architects and Builders

1 "AL Structural Stainless Steels"—12 pages on stainless grades, properties, forms, finishes, standard "specs," uses and advantages.

2 "Stainless Steels for Store Fronts and Building Entrances"—40 pages of valuable data on examples and details. AIA File No. 26D.

3 "Stainless Steel Curtain Walls"—A 24-page progress report on methods. AIA File No. 15-H-1.

Write for Details

Address Dept. A-68

Curtain wall panels faced with Allegheny Metal have *all* the advantages. They can give your building the truly modern look. They have a soft, highly attractive luster and permit wide latitude in design for individual appearance. They're light and strong . . . can be used for sheathing or "face-lifting" operations on existing structures, as well as for any type or size of new commercial building or institution.

Compared to brick or masonry construction, stainless curtain walls present savings at every turn: in lighter foundations; in enlarged floor space; in fast all-weather erection; in reduced maintenance, easy cleaning and freedom from painting. And—*compared to any other curtain wall facing material*—stainless steel is the hardest, strongest and most resistant to smoke, fumes, weather, wear, etc. It is the one material that can best take a beating . . . that costs the least in the long run because it lasts the longest.

Our Engineering and Research Staffs, etc., are at your service—anywhere, anytime. ● Let us work with you. ***Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pa.***

Make it BETTER-and LONGER LASTING with Allegheny Metal

WAD 5206 B **Warehouse stocks carried by all Ryerson steel plants**

® AL TIME-TESTED STAINLESS STEEL

A word about

the Steel Situation

You may be wondering what new supply problems you will have because of the recent set-back in steel production. Strike-loss estimates run to nearly a million tons—and even before the strike, spot shortages had already been created by high demand.

In this emergency period, as always, Ryerson stocks undoubtedly can help you. Thousands of tons of certified quality steels are on hand at your nearby Ryerson plant—carbon steels, alloys, and stainless—and our stocks are being built up daily. In the few cases where the exact kind or size you need is not available locally we will check stocks at our 15 other plants for you.

Remember too that when you order from Ryerson you not only have the world's largest reservoir of steel stocks to draw on, but also the advantage of our long experience, unequalled facilities, and complete dedication to quality of product and service.

So for help on emergency or regular requirements—call your nearby Ryerson plant today.

PRINCIPAL PRODUCTS IN STOCK

BARS, CARBON STEEL—Hot rolled and cold finished—rounds, squares, hexagons, etc.

STRUCTURALS—Channels, angles, beams, etc.

PLATES—Welding and forming quality, abrasion resisting, E-Z-Cut, flange quality, safety plate, etc.

SHEETS & STRIP—Hot and cold rolled, many types and sizes, cut to exact sizes.

TUBING—Seamless and welded mechanical and boiler tubes, hydraulic tubing, etc.

ALLOY STEEL—All types including leaded alloys.

STAINLESS—Allegheny metal bars, plates, sheets, pipe, tubing, fittings, etc.

BUILDING PRODUCTS—Reinforcing bars, spirals, bar joists, wire mesh, etc.

MACHINERY & TOOLS—For metal fabrication.

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CHARLOTTE, N. C. • CINCINNATI • CLEVELAND
DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

STEEL OUTLOOK

Markets and Prices

The Iron Age SUMMARY . . .

Runaway scrap market has steel and Government people worried . . .Washington meeting will try to iron out problem . . . Maintenance growing more serious.

Scrap Jitters . . . A runaway scrap market is giving the steel industry and Washington a bad case of the jitters. Scrap prices have skyrocketed to near-record levels.

The crisis in scrap brought top-level buyers, sellers, and Administration officials together in Washington this week to wrestle with the problem. It will be a tough nut to crack.

Rhubarb Over Controls . . . The question of controls in one form or another is certain to be brought up. It will center about further restrictions on exports to relieve the domestic supply problem. And it will cause a big rhubarb between buyers and sellers. It will also involve our Allies and their need for scrap.

Everybody involved will have to tread softly. Because if scrap is controlled, why not control other metallics, including finished steel?

Scrap Not Only Problem . . . The scrap hassle is one of three major problems besetting the steel industry. The others are (1) disgruntled customers, and (2) maintenance, which has developed into something approaching major proportions.

There are more dissatisfied steel consumers today than there were during the tight market of 1953. Everyone has the feeling he's being shortchanged. Some consumers are facing the prospect of slowing their production lines if they don't get relief in a hurry. And the outlook for some of them is not too encouraging.

What's Happening . . . Blast furnaces, openhearths, and rolling mills are showing the effect of long months of wear and tear, and the recent steel strike. One large producer was forced to take a blast furnace out of production two months ahead of schedule. The mortality on openhearths is reflected in the failure of mills to meet production schedules. The plate mill of a large company with plants in the Midwest will be out for two weeks due to breakdown.

Operations this week are scheduled at 94 pct of capacity, up two points from last week.

Market Still Strong . . . Meanwhile, demand continues to exceed capacity at most mills. Backlogs are still growing. Delivery promises are weeks behind schedule. A carryover from fourth quarter into 1956 is a certainty.

Steel Output, Operating Rates

	This Week†	Last Week	Month Ago	Year Ago
Production (Net ton, 000 omitted)	2,255	2,207	2,075*	1,525
Ingot Index (1947—49=100)	140.25	137.25	129.0*	94.9
Operating Rates				
Chicago	96.0	94.0	92.0*	70.5*
Pittsburgh	99.0	95.0	93.0	61.0
Philadelphia	94.0	....	85.0	56.0
Valley	93.0	93.0	88.0*	58.0*
West	97.0	101.0	81.0*	79.0*
Detroit	90.0	89.0	82.0	62.0
Buffalo	100.0*	100.0*	86.0	57.0
Cleveland	100.0	88.0	89.0*	67.5*
Birmingham	21.0	89.0	84.0	64.5
S. Ohio River	85.0	86.0	71.0*	72.0
Wheeling	100.0	93.0	99.0*	86.0*
St. Louis	103.0	98.0	82.0	54.5
Northeast	86.0	87.0	....	....
Aggregate	94.0	92.0	86.0	64.0

*Revised. †Tentative

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.174	5.174	4.797	4.801
Pig iron (Gross ton)	$59.09	$59.09	$56.59	$56.59
Scrap, No. 1 hvy (gross ton)	$43.33	$41.50	$36.50	$27.83
Nonferrous				
Aluminum, ingot	23.20	23.20	23.20	21.50
Copper, electrolytic	36.00	36.00	36.00	30.00
Lead, St. Louis	14.80	14.80	14.80	13.80
Magnesium, ingot	29.25	29.25	29.25	27.75
Nickel, electrolytic	67.67	67.67	67.67	63.08
Tin, Straits, N. Y.	97.50	98.125*	94.75	95.50
Zinc, E. St. Louis	12.50	12.50	12.50	11.00

4th Quarter Orders Big Poser

Hard-pressed consumers now cite defense priority to step up 4th quarter deliveries . . . Many mills are booked through year on major products . . . No letup in sight.

◆ PROSPECTS OF getting fourth quarter delivery on major steel products is posing plenty of headaches for consumers.

Back-to-the-wall steel consumers in Cleveland are shaking their defense priority ratings at producers in efforts to step up delivery. Impetus at the moment is on orders for reinforcing bars used by contractors for atomic energy plants and some munitions depot construction.

Elsewhere around the country, major producing areas are sold out for the year on such major mill items as sheet, strip, and bars.

A strike of 100 trainmen on a railroad serving Tennessee Coal and Iron Div. of U. S. Steel Corp. has shut down the plant as 25,000 steel workers refused to cross picket lines. The strike revolves around a demand for higher wages. T. C. & I. last Saturday was forced to bank its blast furnaces and take its openhearths out of production. The walkout further tightened an already-serious supply situation for consumers in the area.

Central Iron & Steel Co., announces an increase of $12 a ton on carbon steel plates to $5.10 per cwt, effective Aug. 1. Phoenix Iron & Steel Co. reports a step-up in structural shape prices of $10 a ton to $5.15 per cwt, effective Aug. 1. Higher scrap and iron ore prices were blamed for the hikes.

Lone Star Steel Co. has revoked recent price increases on linepipe, casing, and steel plate. Initially, the firm offered to pay employes in bargaining unit jobs retroactive wages effective July 1. Wages were at the same rates as agreed upon by other steel companies. Product prices were subsequently raised to meet expected labor costs. When labor later turned down the proposed wage increases, the company decided to go back to its former product price list. The present union contract is effective until Sept. 7 with price increases remaining on tubing which the firm buys from outside sources.

SHEETS AND STRIP . . . Production downtime for motor generator repair plus downtime for new mill construction in the South have added new woes for sheet and strip Consumers dependent on **Cleveland** mills. One **Cleveland** mill has lost an estimated two weeks hot strip production resulting from a burned out generator, while another producer's construction of new CR and galvanized facilities in the South will set back delivery schedules 6 mos. for these tight items. Sheet and strip carryovers of 30-45 days are continuing to advance in **Chicago.** Automakers are pressing for sheet and are reported stocking inventory of flatrolled. CR strip and sheet are out for the rest of the year with HR as bad. **Pittsburgh** mills have eliminated all but token sheet and strip orders for October and have reduced customer tonnages for November and December. In the **East,** major sheet and strip producers are currently eyeing 4th quarter orders carefully, are trying to establish as near-normal buying patterns as possible in the face of heavy customer demand. Carryovers on major items are now running 4 to 6 weeks. In **Detroit,** harried producers have been forced to wipe out the month of October in a vain effort to catch up with heavy sheet and strip demand. These items are sold out for the year.

BARS . . . **West Coast** mills are booking bar orders well into 4th quarter, with some increase in demand reported from the highway and bridge construction fields. In **Detroit,** current railroad orders have put a strain on billet production with bars, for all practical purposes, now sold out for the year. Mill bar stock in **Chicago** is exhausted for the year and mill buyers are regularly filling gaps at warehouses. Mill carryovers of 60 days are expected by early 4th quarter. A very tight 4th quarter bar picture is in store for **Cleveland** consumers with the big problem centering on tonnage, not time. In **Pittsburgh,** bar backlogs are building up rapidly and it now looks as if customers' orders will be cut in 4th quarter.

STRUCTURALS AND SHAPES . . . In the **East,** heavy 4th quarter customer demand finds major producers talking Sept.-Oct. delivery at the earliest. Mill orders in **Pittsburgh** are still out of line with production and further cuts are expected.

PLATE . . . Owing to the current topheavy demand for sheet in **Detroit,** two mills have halted plate output temporarily imposing new problems on harried plate consumers. Heavy plate demand in the **East,** with railroad buying currently an important factor, has major producers talking Sept.-Oct. delivery at the moment. **Pittsburgh** mills have adopted a no-orders-for-October policy on plate. Maintenance problems on finishing facilities are a current headache affecting the year's output balance.

WIRE PRODUCTS . . . Construction wire is assured good production in **Pittsburgh** well into 1956. Wire mesh is tight right now. There's also solid demand for manufacturers wire, little affected by the current auto model changeover period. Merchant wire is reported seasonally slow in **Detroit,** but there's good demand for rod and stainless, nearly out for the balance of 4th quarter. In **Chicago,** merchant wire demand is on the upsweep with farm buying spurring the impetus.

Purchasing Agent's Checklist:

COPPER: Lengthy strike has made an impossible supply problem p. 35

STEEL: Looks like 1955 will be a record-breaking year . . . . . p. 37

SINTERING: Heavy hot pig demand spotlights sintering plant . . . p. 39

MACHINE TOOLS: Upcoming Chicago show poses big problems p. 63

Comparison of Prices

(Effective Aug. 2, 1955)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Aug. 2 1955	July 26 1955	July 5 1955	Aug. 3 1954
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.325¢	4.325¢	4.05¢	4.05¢
Cold-rolled sheets	5.325	5.325	4.95	4.95
Galvanized sheets (10 ga.)	5.85	5.85	5.45	5.45
Hot-rolled strip	4.325	4.325	4.05	4.05
Cold-rolled strip	6.29	6.29	5.79	5.82
Plate	4.52	4.52	4.225	4.237
Plates wrought iron	9.30	9.30	9.30	9.30
Stainl's C-R strip (No. 302)	44.50	44.50	41.50	41.50
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$9.05	$9.05	$9.05	$8.95
Tinplate, electro (0.50lb.)	7.75	7.75	7.75	7.65
Special coated mfg. terns	7.85	7.85	7.85	7.75
Bars and Shapes: (per pound)				
Merchant bars	4.65¢	4.65¢	4.30¢	4.312¢
Cold-finished bars	5.90	5.90	5.40	5.40
Alloy bars	5.65	5.65	5.075	5.075
Structural shapes	4.60	4.60	4.25	4.25
Stainless bars (No. 302)	38.25	38.25	35.50	35.50
Wrought iron bars	10.40	10.40	10.40	10.40
Wire: (per pound)				
Bright wire	6.25¢	6.25¢	5.75¢	5.75¢
Rails: (per 100 lb.)				
Heavy rails	$4.725	$4.725	$4.45	$4.45
Light rails	5.65	5.65	5.35	5.35
Semifinished Steel: (per net ton)				
Rerolling billets	$68.50	$68.50	$64.00	$64.00
Slabs, rerolling	68.50	68.50	64.00	64.00
Forging billets	84.50	84.50	78.00	78.00
Alloy blooms, billets, slabs	96.00	96.00	86.00	86.00
Wire Rod and Skelp: (per pound)				
Wire rods	5.025¢	5.025¢	4.675¢	4.675¢
Skelp	4.225	4.225	3.90	3.90
Finished Steel Composite: (per pound)				
Base price	5.174¢	5.174¢	4.797¢	4.801¢

	Aug. 2 1955	July 26 1955	July 5 1955	Aug. 3 1954
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$63.69	$63.69	$61.19	$61.19
Foundry, Valley	59.00	59.00	56.50	56.50
Foundry, Southern, Cin'ti	62.93	62.93	60.43	60.43
Foundry, Birmingham	55.38	55.38	52.88	52.88
Foundry, Chicago	59.00	59.00	56.50	56.50
Basic, del'd Philadelphia	62.77	62.77	60.27	60.27
Basic, Valley furnace	58.50	58.50	56.00	56.00
Malleable, Chicago	59.00	59.00	56.50	56.50
Malleable, Valley	59.00	59.00	56.50	56.50
Ferromanganese‡, cents per lb.	9.50¢	9.50¢	9.50¢	10.00¢

‡ 74-76 pct Mn base.

Pig Iron Composite: (per gross ton)				
Pig iron	$59.09	$59.09	$56.59	$56.59
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$45.00	$41.50	$37.50	$29.50
No. 1 steel, Phila. area	43.50	42.50	38.50	24.50
No. 1 steel, Chicago	41.50	40.50	35.50	29.50
No. 1 bundles, Detroit	38.50	34.50	29.00	23.50
Low phos., Youngstown	46.50	42.50	38.50	32.50
No. 1 mach'y cast, Pittsburgh	44.50	44.50	43.50	42.50
No. 1 mach'y cast, Philadel'a.	45.50	45.00	44.50	39.50
No. 1 mach'y cast, Chicago	52.50	50.50	48.00	39.50
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	$43.33	$41.50*	$36.50	$27.83
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$18.25	$18.25	$18.25	$14.38
Foundry coke, prompt	16.25	16.25	16.25	16.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	36.00	36.00	36.00	30.00
Copper, Lake, Conn.	36.00	36.00	36.00	30.00
Tin, Straits, New York	97.50†	98.125*	98.25	96.50
Zinc, East St. Louis	12.50	12.50	12.50	11.00
Lead, St. Louis	14.80	14.80	14.80	13.80
Aluminum, virgin ingot	23.20	23.20	23.20	21.50
Nickel, electrolytic	67.67	67.67	67.67	63.08
Magnesium, ingot	29.25	29.25	29.25	27.75
Antimony, Laredo, Tex.	28.50	28.50	28.50	28.50

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

←To identify producers, see Key on P. 139→

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem *B3*	60.50	61.00	61.50	62.00	.....
Birdsboro, Pa. *B6*	60.50	61.00	61.50	62.00	.....
Birmingham *R3*	54.50	55.00	.....	.....	.....
Birmingham *W9*	54.50	55.00	.....	.....	.....
Birmingham *U4*	54.50	55.00	59.00	.....	.....
Buffalo *R3*	58.50	59.00	59.50	.....	.....
Buffalo *H1*	58.50	59.00	59.50	.....	.....
Buffalo *W6*	58.50	59.00	59.50	60.00	.....
Chester *C17*	54.50	55.00	55.50	.....	.....
Chicago *I4*	58.50	59.00	59.00	59.50	.....
Cleveland *A5*	58.50	59.00	59.00	59.50	63.50
Cleveland *R3*	58.50	59.00	59.00	.....	.....
Daingerfield *L3*	55.00	55.00	55.00	.....	.....
Duluth *I4*	58.50	59.00	59.00	59.50	.....
Erie *I4*	58.50	59.00	59.00	59.50	.....
Everett *M6*	.....	61.00	61.50	.....	.....
Fontana *K1*	64.50	65.00	.....	.....	.....
Geneva, Utah *C7*	58.50	59.00	.....	.....	.....
Granite City *G2*	60.40	60.90	61.40	.....	.....
Hubbard *Y1*	.....	.....	59.00	.....	.....
Minnequa *C6*	60.50	61.00	61.50	.....	.....
Monessen *P6*	58.50	.....	.....	.....	.....
Neville Is. *P4*	58.50	59.00	59.00	.....	.....
N. Tonawanda *T1*	.....	59.00	59.50	.....	.....
Pittsburgh *U1*	58.50	.....	.....	59.50	.....
Sharpsville *S3*	58.50	59.00	59.00	59.50	.....
So. Chicago *R3*	58.50	.....	59.00	.....	.....
Steelton *B3*	60.50	61.00	61.50	62.00	66.50
Swedeland *A2*	60.50	61.00	61.50	62.00	.....
Toledo *I4*	58.50	59.00	59.00	59.50	.....
Troy, N. Y. *R3*	60.50	61.00	61.50	62.00	66.50
Youngstown *Y1*	.....	.....	59.00	59.50	.....

* DIFFERENTIALS: Add, 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional, 0.25 pct nickel. Subtract 38¢ per ton for phosphorus content 0.70 and over.

Silvery Iron: Buffalo, *H1*, $68.75; Jackson, *J1, G1*, $67.50. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add $1 per ton for 0.75 pct or more phosphorus. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

* Unrevised.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	17.75	19.00	—	20.25	31.00	25.00	37.75	15.00	—	15.25
Slabs, billets, rerolling	22.25	24.75	26.75	26.00	40.25	32.00	49.50	19.50	—	19.75
Forg. discs, die blocks, rings	—	—	—	—	—	—	—	—	—	—
Billets, forging	—	32.00	34.75	33.75	51.25	38.25	58.00	25.50	26.00	26.00
Bars, wires, structurals	38.00	38.25	41.00	40.25	60.75	45.25	68.00	30.50	31.00	31.00
Plates	—	40.25	—	43.00	64.00	49.25	73.25	31.75	—	32.25
Sheets	44.25	44.50	—	47.25	69.25	54.25	82.00	36.25	—	36.75
Strip, hot-rolled	32.00	34.50	—	37.25	58.25	44.25	66.75	—	—	—
Strip, cold-rolled	41.00	44.50	—	47.25	69.25	54.25	82.00	36.25	—	36.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; McKeesport, Pa., *U1*; Washington, Pa., *W2, J3*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U3*; New Castle, Ind., *I2*; Ft. Wayne, *J4*; Philadelphia, *D5*.

Strip: Midland, Pa., *C11*; Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; W. Leechburg, Pa., *A3*; Bridgeville, Pa., *U2*; Detroit, *M2*; Canton-Massillon, O., *R3*; Middletown, O., *A7*; Harrison, N. J., *D3*; Youngstown, *C5*; Sharon, Pa., *S1*; Butler, Pa., *A7*; Wallingford, Conn., *U3*; .25¢ per lb higher‖*W1* (.25¢ per lb higher); New Bedford, Mass., *R6*.

Bar: Baltimore, *A7*; Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2* Washington, Pa., *J3*; McKeesport, Pa., *U1, F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R3*; Chicago, *U1*; Syracuse, N. Y. *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Canton, O., *T5*; Ft. Wayne, *I4*; Philadelphia, *D5*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*.

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*.

Plates: Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown, *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*; Philadelphia, *D5*.

Forged discs, die blocks, rings: Pittsburgh, *C11*; Syracuse, *C11*; Ferndale, Mich., *A3*; Washington, Pa., *J3*.

Forgings billets: Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J3*; McKeesport, *F1*; Massillon, Canton, O., *R3*; Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*.

IRON AND STEEL SCRAP MARKETS

Prices Continue Upward Climb

All major areas record broad new gains . . . Cleveland leads price surge . . . Automotive tonnages off 50 pct, prices advance $4 in Detroit . . . Composite up $1.83.

STRONGEST scrap market in months continued to show tight supply, heavy demand and advancing prices.

Major steelmaking centers again registered hefty price increases. No. 1 heavy melting went up $3 in Pittsburgh, $1 in Philadelphia and Chicago.

Other areas shared in the general strength as local producers bid against Pittsburgh offers. In Cleveland, price of No. 1 heavy melting jumped $5.50 on the topside. In St. Louis, No. 1 went up $2 in a definite move to keep scrap at home.

Reflecting overall market strength, THE IRON AGE Composite for No. 1 heavy melting steel scrap moved up another $1.83 to $43.33.

Commerce Dept. is meeting this week to consider the question of scrap export curbs. Previous studies produced no serious restrictions. Supply is tight now but it isn't likely that the government will single out scrap for tight export curbs.

Pittsburgh . . . The market took another jump this week as brokers were reported paying as high as $45 for No. 1 heavy melting. A mill on the fringe of the district made a purchase of openhearth scrap at $45.50 for No. 1 heavy melting, $42.50 for No. 2 heavy melting and $38.50 for No. 2 bundles. A tonnage of industrial bundles was sold between $48.50 and $49. Brokers aren't too anxious to take new orders with considerable tonnages to be filled on the old $35 and the $40 orders. The mills would also like to see the outstanding orders filled.

Chicago . . . The market continued to advance. Railroad heavy melting lists moved to $48 and were sustained by mill purchases, though an asking price of $45 was still being reported. In view of the tight supply situation, an order at this figure is regarded as extremely difficult to fill. Turnings again broke through as shoveling sales at $32 were reported followed by an advance in machine shop turnings to $30. Broker buying prices were again advancing as efforts were made to cover new mill orders written last week, but by week's end many grades found broker buying again at the consumer delivered price level. Estimates vary, but it is expected that anywhere from a $3 to as much as a $5 raise in the general market price level can be expected.

Philadelphia . . . Price of No. 1 heavy melting took another $1 jump upward this week to a top of $44. No. 2 heavy melting is up 50¢, while No. 2 bundles show a new topside level of $36. Blast furnace grades moved up $1 in sympathy together with advances averaging $1 in a rapidly strengthening cast market. Generally, the market continues strong with dealers reporting near normal intake into yards. With the threat of a runaway market still in evidence, brokers are moving slowly on the export side as new pressure is again cropping up in Washington for regulatory measures.

New York . . . The market here remains strong and tight. Prices of steelmaking grades advanced $1 to $2. Turnings went up the same amounts. Cast grades registered scattered gains.

Detroit . . . The market is continuing to climb here at a rapid pace. Bids on automotive lists, which closed last week, were up at least $4. Tonnages on the lists were as much as 50 pct smaller than they were 3 months ago. The small tonnages are helping to keep the market up as brokers and dealers are still short on last month's orders and are being forced to cover at a higher price.

Cleveland . . . Valley market took another sudden jump of $6 at top level last week with the purchase by two mills of almost 50,000 tons of top grade heavy melting and electric furnace scrap at $47 in comparable freight area. A smaller tonnage of special scrap was sold the Valley for $48. Cleveland price on top grades rose sympathetically although no major steel mill in city has purchased.

Birmingham . . . Despite recent price increases announced by Southern mills, dealers seem reluctant to sell and brokers say they are paying more than they are getting for some grades in order to cover orders. Exporters at a couple of Eastern ports were caught short of scrap for current loading and are reported paying as much as $38 for No. 1 and $35 to $36 for No. 2, with No. 2 bundles bringing as much as $32.

St. Louis . . . Further sharp advances in scrap iron prices were recorded in St. Louis industrial district. These are in line with higher prices in Chicago and other markets, local consumers being forced to meet this competition to retain the material for this market.

Cincinnati . . . Major local mills came into market last week at $44 for No. 1 grades. Another area mill got entire monthly factory bundle supply of over 14,000 tons for over $44 or $6.50 higher than last month. At that time a broker took almost the entire tonnage, largely for barge shipment to Pittsburgh.

Buffalo . . . No. 1 heavy melting and blast furnace grades jumped $5 per ton on the basis of buying from other sections. Purchases were made by Valley consumers as local mills refused at first to boost bids in accordance with strength elsewhere.

Boston . . . Market remains very busy for this time of year. Eastern Pennsylvania, Pittsburgh and export buyers are all taking scrap. Prices of steelmaking grades advanced $1. Only slow item is mixed borings and turnings.

West Coast . . . Mill inventories still healthy despite continued heavy exporting. There's enough scrap to go around. But signs of a tightening market are showing up in San Francisco and Los Angeles. San Francisco No. 1 cupola cast jumped $3 per ton.

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IMPORT & EXPORT – **LIVINGSTON & SOUTHARD, INC.,** 99 Park Ave., New York, N. Y. • *Cable Address:* **FORENTRACO**

Scrap Prices *(Effective Aug. 2, 1955)*

Pittsburgh

No. 1 hvy. melting	$45.00
No. 2 hvy. melting	42.00
No. 1 bundles	45.00
No. 2 bundles	$37.00 to 38.00
Machine shop turn.	24.50 to 25.50
Mixed bor. and ms. turns.	24.50 to 25.50
Shoveling turnings	28.50 to 29.50
Cast iron borings	28.50 to 29.50
Low phos. punch'gs, plate	47.00 to 48.00
Heavy turnings	42.00 to 43.00
No. 1 RR. hvy. melting	43.50 to 44.50
Scrap rails, random lgth.	47.50 to 48.50
Rails 2 ft and under	52.00 to 53.00
RR. steel wheels	49.00 to 50.00
RR. spring steel	49.00 to 50.00
RR. couplers and knuckles	49.00 to 50.00
No. 1 machinery cast	44.00 to 45.00
Cupola cast	41.00 to 42.00
Heavy breakable cast	35.00 to 36.00

Chicago

No. 1 hvy. melting	$41.00 to $42.00
No. 2 hvy. melting	36.00 to 37.00
No. 1 factory bundles	44.00 to 45.00
No. 1 dealers' bundles	41.00 to 42.00
No. 2 dealers' bundles	31.00 to 32.00
Machine shop turn.	28.00 to 30.00
Mixed bor. and turn.	30.00 to 32.00
Shoveling turnings	30.00 to 32.00
Cast iron borings	30.00 to 32.00
Low phos. forge crops	47.00 to 48.00
Low phos., punch'gs, plate	45.00 to 46.00
Low phos. 2 ft and under	44.00 to 45.00
No. 1 RR. hvy. melting	47.00 to 48.00
Scrap rails, random lgth.	54.00 to 55.00
Rerolling rails	63.00 to 64.00
Rails 2 ft and under	60.00 to 61.00
Locomotive tires, cut	45.00 to 46.00
Cut bolsters & side frames	48.00 to 49.00
Angles and splice bars	53.00 to 54.00
RR. steel car axles	52.00 to 53.00
RR. couplers and knuckles	50.00 to 51.00
No. 1 machinery cast	52.00 to 53.00
Cupola cast	47.00 to 48.00
Heavy breakable cast	39.00 to 40.00
Cast iron brake shoes	37.00 to 39.00
Cast iron car wheels	42.00 to 44.00
Malleable	51.00 to 52.00
Stove plate	39.00 to 40.00

Philadelphia Area

No. 1 hvy. melting	$43.00 to $44.00
No. 2 hvy. melting	38.50 to 39.50
No. 1 bundles	43.00 to 44.00
No. 2 bundles	34.00 to 36.00
Machine shop turn.	27.00 to 28.00
Mixed bor. short turn.	27.00 to 28.00
Cast iron borings	27.00 to 28.00
Shoveling turnings	29.00 to 30.00
Clean cast chem. borings	27.00 to 28.00
Low phos. 5 ft and under	45.00 to 46.00
Low phos. 2 ft and under	46.00 to 47.00
Low phos. punch'gs	46.00 to 47.00
Elec. furnace bundles	44.00 to 45.00
Heavy turnings	39.00 to 40.00
RR. steel wheels	46.00 to 47.00
RR. spring steel	46.00 to 47.00
Rails 18 in. and under	52.00 to 54.00
Cupola cast	36.00 to 38.00
Heavy breakable cast	43.00 to 44.00
Cast iron car wheels	47.00 to 48.00
Malleable	46.50 to 47.50
Unstripped motor blocks	28.00 to 30.00
No. 1 machinery cast	45.00 to 46.00

Cleveland

No. 1 hvy. melting	$43.50 to $44.50
No. 2 hvy. melting	38.00 to 39.00
No. 1 bundles	43.50 to 44.50
No. 2 bundles	35.00 to 36.00
No. 1 busheling	43.50 to 44.50
Machine shop turn.	25.00 to 26.00
Mixed bor. and turn.	27.00 to 28.00
Shoveling turnings	27.00 to 28.00
Cast iron borings	27.00 to 28.00
Cut struct'r'l & plates, 2 ft & under	49.00 to 50.00
Drop forge flashings	43.00 to 44.00
Low phos. punch'gs, plate	44.00 to 45.00
Foundry steel, 2 ft & under	48.00 to 49.00
No. 1 RR. heavy melting	44.50 to 45.50
Rails 2 ft and under	53.00 to 54.00
Rails 18 in. and under	54.00 to 55.00
Railroad grate bars	36.00 to 37.00
Steel axle turnings	29.00 to 30.00
Railroad cast	48.00 to 49.00
No. 1 machinery cast	48.00 to 49.00
Stove plate	44.00 to 45.00
Malleable	48.00 to 49.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Youngstown

No. 1 hvy. melting	$46.00 to $47.00
No. 2 hvy. melting	41.00 to 42.00
No. 1 bundles	46.00 to 47.00
No. 2 bundles	39.00 to 40.00
Machine shop turn.	24.00 to 25.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	29.00 to 30.00
Low phos. plate	46.00 to 47.00

Buffalo

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 busheling	39.00 to 40.00
No. 1 bundles	39.00 to 40.00
No. 2 bundles	31.00 to 32.00
Machine shop turn.	26.00 to 27.00
Mixed bor. and turn.	28.00 to 29.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	28.00 to 29.00
Low phos. plate	42.00 to 43.00
Scrap rails, random lgth.	41.00 to 42.00
Rails 2 ft and under	46.00 to 47.00
RR. steel wheels	38.00 to 39.00
RR. spring steel	38.00 to 39.00
RR. couplers and knuckles	38.00 to 39.00
No. 1 machinery cast	43.00 to 44.00
No. 1 cupola cast	40.00 to 41.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 bundles, openhearth	38.00 to 39.00
No. 2 bundles	25.00 to 26.00
New busheling	38.00 to 39.00
Drop forge flashings	37.50 to 38.50
Machine shop turn.	19.00 to 20.00
Mixed bor. and turn.	21.00 to 22.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	21.00 to 22.00
Low phos. punch'gs, plate	38.00 to 39.00
No. 1 cupola cast	39.00 to 40.00
Heavy breakable cast	32.00 to 33.00
Stove plate	34.00 to 35.00
Automotive cast	42.00 to 43.00

St. Louis

No. 1 hvy. melting	$36.50 to $37.50
No. 2 hvy. melting	34.00 to 35.00
No. 1 bundles	36.50 to 37.50
No. 2 bundles	29.50 to 30.50
Machine shop turn.	27.00 to 28.00
Cast iron borings	23.00 to 24.00
Shoveling turnings	27.00 to 28.00
No. 1 RR. hvy. melting	41.00 to 42.00
Rails, random lengths	46.00 to 47.00
Rails, 18 in. and under	54.00 to 55.00
Locomotive tires uncut	41.00 to 42.00
Angles and splice bars	43.00 to 44.00
Std. steel car axles	43.50 to 44.50
RR. specialties	45.00 to 46.00
Cupola cast	45.00 to 46.00
Heavy breakable cast	39.00 to 40.00
Cast iron brake shoes	37.00 to 38.00
Stove plate	38.00 to 39.00
Cast iron car wheels	42.00 to 43.00
Malleable	42.50 to 43.50
Unstripped motor blocks	38.50 to 39.50

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	26.50 to 27.50
No. 1 bundles	34.00 to 35.00
No. 2 bundles	24.00 to 25.00
No. 1 busheling	34.00 to 35.00
Elec. furnace, 3 ft & under	35.00 to 36.00
Machine shop turn.	16.00 to 16.50
Mixed bor. and short turn.	15.50 to 16.00
Shoveling turnings	18.50 to 19.00
Clean cast chem. borings	17.00 to 18.00
No. 1 machinery cast	31.00 to 32.00
Mixed cupola cast	29.00 to 30.00
Heavy breakable cast	31.00 to 32.00
Stove plate	28.00 to 29.00
Unstripped motor blocks	17.00 to 18.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$39.00
No. 2 hvy. melting	$34.00 to 35.00
No. 2 bundles	27.00 to 28.00
Machine shop turn.	18.00 to 19.00
Mixed bor. and turn.	19.00 to 20.00
Shoveling turnings	20.00 to 21.00
Clean cast chem. borings	21.00 to 22.00
No. 1 machinery cast	35.00 to 37.00
Mixed yard cast	32.00 to 33.00
Charging box cast	36.00 to 37.00
Heavy breakable cast	36.00 to 37.00
Unstripped motor blocks	24.00 to 25.00

Birmingham

No. 1 hvy. melting	$32.00 to $33.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 bundles	32.00 to 33.00
No. 2 bundles	24.00 to 25.00
No. 1 busheling	32.00 to 33.00
Machine shop turn.	19.00 to 20.00
Shoveling turnings	24.00 to 25.00
Cast iron borings	15.00 to 16.00
Electric furnace bundles	34.00 to 35.00
Bar crops and plate	38.00 to 39.00
Structural and plate, 2 ft	37.00 to 38.00
No. 1 RR. hvy. melting	38.00 to 39.00
Scrap rails, random lgth.	43.00 to 44.00
Rails, 18 in. and under	48.00 to 49.00
Angles & splice bars	44.00 to 45.00
Rerolling rails	51.00 to 52.00
No. 1 cupola cast	46.00 to 47.00
Stove plate	43.00 to 44.00
Charging box cast	23.00 to 24.00
Cast iron car wheels	34.00 to 35.00
Unstripped motor blocks	35.00 to 36.00
Mashed tin cans	15.00 to 16.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 bundles	39.00 to 40.00
No. 2 bundles	34.00 to 35.00
Machine shop turn.	27.00 to 28.00
Mixed bor. and turn.	24.00 to 25.00
Shoveling turnings	32.00 to 33.00
Cast iron borings	24.00 to 25.00
Low phos., 18 in. & under	43.00 to 44.00
Rails, random lengths	44.00 to 45.00
Rails, 18 in. and under	51.00 to 52.00
No. 1 cupola cast	44.00 to 45.00
Hvy. breakable cast	38.00 to 39.00
Drop broken cast	49.00 to 50.00

San Francisco

No. 1 hvy. melting	$32.00
No. 2 hvy. melting	30.00
No. 1 bundles	32.00
No. 2 bundles	27.00
No. 3 bundles	23.00
Machine shop turn.	12.00
Cast iron borings	11.00
No. 1 RR. hvy. melting	32.00
No. 1 cupola cast	45.00

Los Angeles

No. 1 hvy. melting	$32.00
No. 2 hvy. melting	30.00
No. 1 bundles	32.00
No. 2 bundles	25.00
No. 3 bundles	22.00
Machine shop turn.	10.00
Shoveling turnings	12.00
Cast iron borings	12.00
Elec. furn. 1 ft. and under	32.00
No. 1 RR. hvy. melting	32.00
No. 1 cupola cast	42.00

Seattle

No. 1 hvy. melting	$33.00
No. 2 hvy. melting	29.00
No. 2 bundles	23.00
No. 3 bundles	19.00
No. 1 cupola cast	35.00
Mixed yard cast	35.00

Hamilton, Ont.

No. 1 hvy. melting	$34.00
No. 2 hvy. melting	31.00
No. 1 bundles	34.00
No. 2 bundles	28.00
Mixed steel scrap	28.00
Bushelings	29.00
Bush., new fact prep'd	32.00
Bush., new fact unprep'd	28.00
Machine shop turn.	16.00
Short steel turnings	21.00
Mixed bor. and turn.	$16.00 to 17.00
Rails, rerolling	43.00
Cast scrap	42.00 to 45.00

Aluminum Price Follows Wages

ALCOA follows steel pattern with 15¢ package wage boost . . . Announce price hike next day . . . Other manufacturers expected to follow suit.

◆ ALUMINUM . . . In a move that surprised no one, Aluminum Company of America continued wage negotiations with the CIO United Steelworkers until the 11th hour and then announced mutual agreement on a 15¢ package wage increase. A similar settlement was made with AFL Aluminum Workers International Union representing about 11,000 ALCOA workers.

The agreement stipulates an 11½¢ across-the-board increase and 3½¢ for rate structure adjustments.

ALCOA executives had obviously anticipated a settlement on approximately this basis because the very next day they declared a round of price increases especially designed to offset the wage dent on the company take. 99% minimum average aluminum pig jumped 1¢ per pound to 22.5¢ per pound. 99%+ aluminum ingot rose 1.2¢ to 24.4¢ per pound. Adjustment in the price of other ALCOA products is being made accordingly.

The higher price should help to make it a banner year for ALCOA which reported a net earning of $36,027,480 for the first six months of 1955 as compared with $19,235,642 for the like period last year.

Negotiations between Reynolds Metals Company and union representatives were interrupted by the untimely death over last weekend of Richard S. Reynolds, founder and chairman of the company. However all indications are that upon resumption of the talks an almost immediate announcement of agreement will be forthcoming following very closely the lead of ALCOA, followed by a corresponding price rise.

The contract between Kaiser Aluminum & Chemical Co. and the union does not expire until the end of August. An unofficial company spokesman told THE IRON AGE there was a strong likelihood that Kaiser would grant their workers a wage increase corresponding to the norm established by ALCOA and Reynolds. Less than 24 hours later the company seemed to corroborate this by announcing a round of price increases corresponding closely to the ALCOA boost.

Effective Aug. 2, Kaiser increased 99 pct plus aluminum pig by 1¢ per lb. The increase on aluminum ingot ranges from 1.2-1.3¢ per lb, depending on the chemical composition. The average sheet price rise amounts to 4-4½ pct.

The price increase by Kaiser is certain to be followed by a wage increase following the pattern.

Both of these major aluminum manufacturers will also raise their prices accordingly.

COPPER . . . Phelps Dodge settled with the International Union of Mine, Mill and Smelter Workers early this week, with resulting optimism that copper production would be resumed at full scale among all producers. The agreement was the first break in the strike which had idled Phelps Dodge as well as Kennecott Copper Co. and International Smelting and Refining Co. Settlement was based on an agreement providing for wage increases of 11½ to 17 cents per hour and expanded health and welfare benefits. No meetings of the union and other producers were scheduled earlier this week, but it was likely that pressure for an early settlement would mount with Phelps Dodge again producing.

Brass producers indicated that unless the strike is settled in a matter of days 65% of their industry will have to shut down because of the lack of copper.

Those who do manage to maintain a semblance of operation will be faced with a very active "gray market" as principal source of supply, according to Herbert Barchoff, president of Eastern Brass and Copper, who warned that inflationary bidding on available supply was already a problem. He declared that the gray market could very well attain Korean War proportions during the traditional fall upsurge. The end result of this could very well be government controls, according to Barchoff.

SILVER . . . pushed its way briefly into the news when hearings were held before a Senate Banking Committee concerning an ancient law which forced the government to purchase all domestically produced silver at a set price. The discussions resolved itself into the viewpoints of industrial users who want a low price and producers who like the subsidy. Declared Under Secretary of the Treasury Burgess, "The purchase is not necessary but creates no serious difficulties."

Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	July 27	July 28	July 29	July 30	Aug. 1	Aug. 2
Copper, electro, Conn.	36.00	36.00	36.00	36.00	....	36.00
Copper, Lake, delivered	36.00	36.00	36.00	36.00	....	36.00
Tin, Straits, New York	97.50	98.25	97.75	97.75	....	....
Zinc, East St. Louis	12.50	12.50	12.50	12.50	12.50	12.50
Lead, St. Louis	14.80	14.80	14.80	14.80	14.80	14.80

Note: Quotations are going prices **Tentative*

Monthly Average Metal Prices

(Cents per lb except as noted)

Average prices of the major nonferrous metals in June based on quotations appearing in THE IRON AGE, were as follows:

Electrolytic copper		Straits tin, New York	72.73
Del'd Conn. Valley	36.00	Zinc, E. St. Louis	13.50
Lake copper, delivered	36.00	Lead, St. Louis	14.90

Nonferrous Prices *(Effective Aug. 2, 1955)*

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Alloy	Flat Sheet			Plate
	0.032 in.	0.081 in.	0.136-0.249 in.	0.250-3.000 in.
1100, 3003	40.8	38.7	37.5	36.5
3004	45.7	41.4	39.7	39.1
5052	48.3	43.4	41.7	39.9
2024-O, -OAL	51.2	42.5	41.0	41.2
7075-O, -OAL	62.6	50.8	48.5	48.6

Magnesium

(F.o.b. mill, freight allowed)

Sheet & Plate: FS1-O ¼ in., 59¢; 3/16 in., 40¢; ½ in., 59¢; 0.064 in., 76¢; 0.032 in., 97¢. Specification grade higher. Base, 30,000 lb.

Extruded Round Rod: M, diam ¼ to 0.311 in., 79¢; ½ to ⅝ in., 62.5¢; 1⅛ to 1.749 in., 59¢; 2½ to 5 in., 54.5¢. Other alloys higher. Base up to ⅝ in. diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes: Rectangles: M. In weight per ft for perimeters less than size indicated: 0.10 to 0.11 lb, 3.5 in., 67.3¢; 0.22 to 0.25 lb, 5.9 in., 64.3¢; 0.50 to 0.59 lb, 8.6 in., 61.7¢; 1.8 to 2.59 lb, 19.5 in., 59.8¢; 4 to 6 lb, 28 in., 55¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, 0.049 to 0.057 in. wall thickness: OD ¼ to 5/16 in., $1.46; 5/16 to ⅝ in., $1.32; ½ to ⅝ in., 99¢; 1 to 2 in., 82¢; 0.165 to 0.219 in. wall: OD, ⅝ to ¾ in., 87¢; 1 to 2 in., 68¢; 3 to 4 in., 62¢. Other alloys higher. Base OD: Up to 1½ in., 10,000 lb; 1¼ to 3 in., 20,000 lb; over 3 in., 30,000 lb.

Titanium

(10,000 lb *base, f.o.b. mill*)

Sheet and strip, commercially pure, $14.00-$14.50; alloy $16.50; Plate, HR, commercially pure, $11.50-$12.00; alloy, $12.50-$12.75; Wire, rolled and/or drawn, commercially pure, $10.50-$11.00; alloy, $12.50; Bar, HR or forged, commercially pure, $8.50-$8.75; alloy, $8.50-$9.00.

Nickel, Monel, Inconel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	102	78	99
Strip, CR	102	87	125
Rod, Bar, HR	87	69	93
Angles, HR	87	69	93
Plate, HR	97	82	95
Seamless Tube	122	108	153
Shot, Blocks		85	

Copper, Brass, Bronze

(Freight included on 500 lb)

	Sheet	Rods	Extruded Shapes
Copper	52.79		54.56
Copper, h-r	54.76	51.11	
Copper, drawn		52.36	
Low brass	49.75	49.69	
Yellow brass	46.27	46.21	
Red brass	50.99	50.93	
Naval brass		44.30	45.56
Leaded brass			43.09
Com. bronze	52.78	52.72	
Mang. bronze	53.73	47.83	49.39
Phos. bronze	73.03	73.53	
Munts metal	48.14	43.95	45.20
Ni silver, 10 pct	60.20	63.38	66.34

Beryllium copper, CR, 1.9% Be, Base 2000 lb, f.o.b.

Strip	$1.74
Rod, bar, wire	1.71

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	24.40
Aluminum pig	22.50
Antimony, American, Laredo, Tex.	28.50
Beryllium copper, per lb cont'd Be	$40.00
Beryllium aluminum 5% Be, Dollars per lb contained Be	$72.75
Bismuth, ton lots	$2.25
Cadmium, del'd	$1.70
Cobalt, 97-99% (per lb)	$2.60 to $2.67
Copper, electro, Conn. Valley	36.00
Copper, Lake, delivered	36.00
Gold, U. S. Treas., per troy oz.	$35.00
Indium, 99.9%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$90 to $100
Lead, St. Louis	14.80
Lead, New York	15.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb, pig	28.50
ingot	29.25
Magnesium, sticks, 100 to 500 lb	49.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$259 to $261
Nickel electro, f.o.b. N. Y. warehouse	67.67
Nickel oxide sinter, at Copper Cliff, Ont., contained nickel	60.75
Palladium, dollars per troy oz.	$22 to $24
Platinum, dollars per troy oz.	$80 to $87
Silver, New York, cents per troy oz.	90.75
Tin, New York	97.50
Titanium, sponge, grade A-1	$3.95
Zinc, East St. Louis	12.50
Zinc, New York	13.00
Zirconium, sponge	$10.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot	
No. 115	37.50
No. 120	37.00
No. 123	36.50
80-10-10 ingot	
No. 305	40.75
No. 315	39.00
88-10-2 ingot	
No. 210	52.25
No. 215	48.25
No. 245	42.75
Yellow ingot	
No. 405	31.75
Manganese bronze	
No. 421	34.75

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper, max.	30.00-31.00
0.60 copper, max.	29.75-30.75
Piston alloys (No. 122 type)	29.00-29.50
No. 12 alum. (No. 2 grade)	28.00-28.50
108 alloy	28.50-29.00
195 alloy	29.25-30.75
13 alloy (0.60 copper max.)	29.75-30.75
AX8-679	28.50-29.00

Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1—95-97½%	29.00-29.50
Grade 2—92-95%	28.00-28.50
Grade 3—90-92%	27.00-27.50
Grade 4—85-90%	26.00-27.00

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 5000 lb lots)

Copper	
Cast, oval, 15 in. or longer	44.92
Electrodeposited	39.78
Flat rolled	45.42
Brass, 80-20	
Cast, oval, 15 in. or longer	43.515
Zinc, flat cast	20.25
Ball, anodes	18.50
Nickel, 99 pct plus	
Cast	90.50*
Cadmium	$1.70
Silver 999 fine, rolled, 100 oz. lots per troy oz., f.o.b. Bridgeport, Conn.	94⅛

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	62.00
Copper sulphate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	31.25*
Nickel chloride, 300 to 400 lb	43.50*
Silver cyanide, 100 oz. lots, per oz.	75½
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drum	54.30

* Effective Jan. 3.

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	33	31¼
Yellow brass	33⅜	32
Red brass	35½	37⅜
Comm. bronze	29¾	28½
Mang. bronze	32 1/6	21⅜
Yellow brass rod ends	33⅜	32

Custom Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	38½
No. 2 copper wire	37
Light copper	35
*Refinery brass	33½

* Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	38
No. 2 copper wire	36½
Light copper	34½
No. 1 composition	31½
No. 1 comp. turnings	31
Rolled brass	23½—24
Brass pipe	24¼—24
Radiators	23½—24½

Aluminum

Mixed old cast	18 —19½
Mixed new clips	18½—20½
Mixed turnings, dry	18½—20

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	35 —35½
No. 2 heavy copper and wire	34 —34½
Light copper	32 —32½
New type shell cuttings	32 —32½
Auto radiators (unsweated)	22 —22½
No. 1 composition	28 —28½
No. 1 composition turnings	27 —28
Unlined red car boxes	22 —22½
Cocks and faucets	22½—23
Mixed heavy yellow brass	18½—19
Old rolled brass	21 —21½
Brass pipe	23½—24
New soft brass clippings	22½—23
Brass pipe	24¼—24
No. 1 brass rod turnings	21 —22

Aluminum

Alum. pistons and struts	15½
Aluminum crankcases	15½
1100 (2S) aluminum clippings	17½—18
Old sheet and utensils	15½—16
Borings and turnings	10 —11
Misc. cast aluminum	15½—16
2024 (24s) clippings	16½—17

Zinc

New zinc clippings	7 — 7⅛
Old zinc	5 — 5⅛
Zinc routings	2⅝— 3
Old die cast scrap	3½— 3⅝

Nickel and Monel

Pure nickel clippings	85 —90
Clean nickel turnings	65 —70
Nickel anodes	80 —85
Nickel rod ends	80
New Monel clippings	38½—42
Clean Monel turnings	29½
Old sheet Monel	34½
Nickel silver clippings, mixed	19
Nickel silver turnings, mixed	15½

Lead

Soft scrap lead	11½—12
Battery plates (dry)	6½— 6⅝
Batteries, acid free	4¼

Magnesium

Segregated solids	18½—19
Castings	17½—18

Miscellaneous

Block tin	77 —80
No. 1 pewter	55 —60
No. 1 auto babbitt	48 —50
Mixed common babbitt	14½
Solder joints	17 —18½
Siphon tops	42
Small foundry type	16½
Monotype	14½—15
Lino. and stereotype	14 —14½
Electrotype	12 —12½
Hand picked type shells	10⅝
Lino. and stereo. dross	5
Electro dross	4¼

IRON AGE

STEEL PRICES

(Effective Aug. 2, 1955)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$96.00 *B3*		4.65 *B3*	6.80 *B3*	4.65 *B3*						
	Buffalo, N. Y.	$68.50 *B3*	$84.50 *R3, B3*	$96.00 *R3, B3*	5.45 *B3*	4.65 *B3*	6.80 *B3*	4.65 *B3*	4.325 *R3,B3*	6.25 *B3* 6.25 *R7, S10*	6.425 *B3*	9.125 *B3*		
	Claymont, Del.													
	Harrison, N. J.													13.45 *C11*
	Conshohocken, Pa.								4.375 *A2*	6.30 *A2*	6.425 *A2*			
	New Bedford, Mass.									6.70 *R6*				
	Johnstown, Pa.	$68.50 *B3*	$84.50 *B3*	$96.00 *B3*		4.65 *B3*	6.80 *B3*							
	Boston, Mass.									6.80 *T8*				13.80 *T8*
	New Haven, Conn.									6.70 *D1* 7.00 *A5*				
	Phoenixville, Pa.					5.15 *P2*		5.15 *P2*						
	Sparrows Pt., Md.								4.325 *B3*	6.25 *B3*	6.425 *B3*	9.125 *B3*		
	Bridgeport, Wallingford, Conn.	$73.50 *N8*	$89.50 *N8*						4.625 *N8*	6.70 *W1*			7.50 *N8*	
	Pawtucket, R. I. Worcester, Mass.									6.80 *N7* 7.10 *A5*				*A5* 13.80 *N7*
MIDDLE WEST	Alton, Ill.								4.50 *L1*					
	Ashland, Ky.								4.325 *A7*					
	Canton-Massillon, Dover, Ohio		$86.50 *R3*	$96.00 *R3*										13.45 *G4*
	Chicago, Ill.	$68.50 *U1*	$84.50 *R3, U1,W8*	$96.00 *R3, U1,W8*	5.45 *U1*	4.60 *U1, W8*	6.75 *U1, Y1*	4.60 *U1*	4.325 *A1, N4,W8*	6.35 *A1,T8*			7.20 *W8*	13.45 *T8*
	Cleveland, Ohio									6.25 *A5,J3*		9.30 *A5*		13.45 *A5*
	Detroit, Mich.			$96.00 *R5*					4.425 *G3,M1*	6.35 *D1,D2, G3,M2,P11*	6.525 *G3*	9.20 *D2, G3*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$68.50 *U1*	$84.50 *U1*	$96.00 *U1, Y1*	5.45 *J3*	4.60 *U1, J3*	6.75 *U1, J3*		4.325 *J3, U1,Y1*	6.35 *J3*	6.425 *J3, U1,Y1*	9.30 *Y1*	7.20 *Y1, U1*	
	Sterling, Ill.								4.425 *N4*					
	Indianapolis, Ind.									*C5*				
	Newport, Ky.												7.20 *N5*	
	Middletown, Ohio									*A7*				
	Niles, Warren, Ohio Sharon, Pa.	$68.50 *C10*	$84.50 *C10*	$96.00 *C10*					4.325 *S1, R3*	6.25 *S1, R3,T4*	6.425 *S1, R3*	9.10 *S1, R3*	7.20 *S1*	13.45 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	$68.50 *U1, J3*	$84.50 *J3, U1,C11*	$96.00 *U1, C11*	5.45 *U1*	4.60 *U1, J3*	6.75 *U1, J3*	4.60 *U1*	4.325 *P6*	6.25 *S7,B4*			7.20 *S9*	13.45 *S9*
	Portsmouth, Ohio								4.325 *P7*	6.25 *P7*				
	Weirton, Wheeling, Follansbee, W. Va.					4.60 *W3*			4.325 *W3*	6.25 *F3,W3*	6.425 *W3*	9.10 *W3*		
	Youngstown, Ohio		$84.50 *C10*	$96.00 *Y1, C10*		4.60 *Y1*	6.75 *Y1*		4.325 *U1, Y1*	6.25 *Y1,C5*	6.425 *U1, Y1*	9.30 *Y1*	7.20 *U1, Y1*	13.45 *C5*
WEST	Fontana, Cal.	$76.00 *K1*	$92.00 *K1*	$115.00 *K1*		5.25 *K1*	7.40 *K1*	5.40 *K1*	5.075 *K1*	8.00 *K1*	7.525 *K1*		8.85 *K1*	
	Geneva, Utah		$84.50 *C7*			4.60 *C7*	6.75 *C7*							
	Kansas City, Mo.					4.70 *S2*	6.85 *S2*				6.675 *S2*		7.45 *S2*	
	Los Angeles, Torrance, Cal.		$94.00 *B2*	$116.00 *B2*		5.30 *C7, B2*	7.45 *B2*		5.075 *C7, B2*	8.30 *C1*			8.40 *B2*	
	Minnequa, Colo.					4.90 *C6*			5.425 *C6*					
	Portland, Ore.					5.35 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$94.00 *B2*			5.25 *B2* *P9*	7.40 *B2*		5.075 *B2, C7*					
	Seattle, Wash.		$98.00 *B2*			5.35 *B2*	7.50 *B2*		5.325 *B2*					
SOUTH	Atlanta, Ga.								4.525 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$68.50 *T2*	$84.50 *T2*			4.60 *C16, R3,T2*	6.75 *T2*		4.325 *R3, C16,T2*		6.425 *T2*			
	Houston, Lone Star, Tex.	*L3*	$89.50 *S2*	$101.00 *S2*		4.70 *S2*	6.85 *S2*				6.675 *S2*		7.45 *S2*	

IRON AGE

STEEL PRICES

(Effective Aug. 2, 1955)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS										WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled 18 ga. & hvyr.	Cold-rolled	Galvanized 10 ga.	Enameling 12 ga.	Long Terne 10 ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled 19 ga.			Cokes° 1.25-lb. base box	Electro° 0.25-lb. base box	Hollowware Enameling 29 ga.
EAST	Bethlehem, Pa.														
	Buffalo, N. Y.	4.325 *B3*	5.325 *B3*				6.375 *B3*	7.875 *B3*				*W6*	† Special coated mfg. terne deduct 95¢ from 1.25-lb coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25-lb. coke base box. ° COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.10. Differential 1.00 lb./0.25 lb. add 85¢.		
	Claymont, Del.														
	Coatesville, Pa.														
	Conshohocken, Pa.	4.375 *A2*	5.375 *A2*				6.425 *A2*								
	Harrisburg, Pa.														
	Hartford, Conn.														
	Johnstown, Pa.											5.025 *B3*			
	Fairless, Pa.	4.375 *U1*	5.375 *U1*				6.425 *U1*	7.925 *U1*					$8.90 *U1*	$7.60 *U1*	
	New Haven, Conn.														
	Phoenixville, Pa.														
	Sparrows Pt., Md.	4.325 *B3*	5.325 *B3*	5.85 *B3*			6.375 *B3*	7.875 *B3*	8.60 *B3*			5.125 *B3*	$8.90 *B3*	$7.60 *B3*	
	Worcester, Mass.											5.325 *A5*			
	Trenton, N. J.														
MIDDLE WEST	Alton, Ill.											5.20 *L1*			
	Ashland, Ky.	4.325 *A7*		5.85 *A7*	5.90 *A7*										
	Canton-Massillon, Dover, Ohio			5.85 *R1, R3*											
	Chicago, Joliet, Ill.	4.325 *A1, W8*					6.375 *U1*					5.025 *A5, N4, R3*			
	Sterling, Ill.											5.125 *N4*			
	Cleveland, Ohio	4.325 *J3, R3*	5.325 *J3, R3*		5.90 *R3*		6.375 *J3, R3*	7.875 *J3, R3*				5.025 *A5*			
	Detroit, Mich.	4.425 *G3, M2*	5.425 *G3, M2*				6.475 *G3*	7.975 *G3*							
	Newport, Ky.	4.325 *N5*	5.325 *N5*	5.85 *N5*											
	Gary, Ind. Harbor, Indiana	4.325 *I3, U1, Y1*	5.325 *I3, U1, Y1*	5.85 *U1, I3*	5.90 *U1, I3*	6.25 *U1*	6.375 *Y1, U1, I3*	7.875 *U1, Y1*				*Y1*	$8.80 *I3, U1, Y1*	$7.50 *I3, U1, Y1*	6.65 *U1, Y1*
	Granite City, Ill.	4.525 *G2*	5.525 *G2*	6.05 *G2*	6.10 *G2*									$7.60 *G2*	6.75 *G2*
	Kokomo, Ind.	4.425 *C9*		5.95 *C9*							5.475 *C9*	5.125 *C9*			
	Mansfield, Ohio	4.325 *E2*	5.325 *E2*			6.25 *E2*					*E2*				
	Middletown, Ohio		5.325 *A7*	5.85 *A7*	5.90 *A7*	6.25 *A7*									
	Niles, Warren, Ohio Sharon, Pa	4.325 *S1, R3 N3*	5.325 *R3 N3*	5.85 *N3, R3*	5.90 *N3*	6.25 *N3*	6.375 *S1, R3*	7.875 *R3*					$8.80 *R3*	$7.50 *R3,*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.325 *J3, U1, P6*	5.325 *J3, U1, P6*	5.85 *U1*	5.90 *U1, A7*		6.375 *J3, U1*	7.875 *U1*	8.60 *U1*			5.025 *A5 P6*	$8.80 *J3, U1*	$7.50 *J3, U1*	6.65 *U1*
	Portsmouth, Ohio	4.325 *P7*	5.325 *P7*									5.025 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.325 *W3, W5*	5.325 *W3, W5, F3*	5.85 *W3, W5*		6.25 *W3, W5*	6.375 *W3*	7.875 *W3*					$8.80 *W3, W5*	$7.50 *W3, W5*	6.65 *F3, W5*
	Youngstown, Ohio	4.325 *U1, Y1*	5.325 *Y1*		5.90 *Y1*		6.375 *U1, Y1*	7.875 *Y1*							
WEST	Fontana, Cal.	5.075 *K1*	6.425 *K1*				7.125 *K1*	8.975 *K1*							
	Geneva, Utah	4.425 *C7*													
	Kansas City, Mo.											5.275 *S2*			
	Los Angeles, Torrance, Cal.											5.825 *B2*			
	Minnequa, Colo.											5.275 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.025 *C7*	6.275 *C7*	6.60 *C7*								5.675 *C7*	$9.55 *C7*	$8.25 *C7*	
	Seattle, Wash														
SOUTH	Atlanta, Ga.														
	Fairfield, Ala. Alabama City, Ala.	4.325 *R3, T2*	5.325 *T2*	5.85 *R3, T2*			6.375 *T2*				5.625 *R3*	5.025 *R3, T2*	$8.90 *T2*	$7.60 *T2*	
	Houston, Tex.											5.275 *S2*			

IRON AGE

STEEL PRICES

(Effective Aug. 2, 1955)

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		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				5.575 *B3*	7.425 *B3*	6.80 *B3*					
	Buffalo, N. Y.	4.65 *B3,R3*	4.65 *B3,R3*	5.95 *B5*	5.575 *B3,R3,*	7.425 *B3,B5*	6.80 *B3*	4.50 *B5,R3*				6.25 *W6*
	Claymont, Del.							4.50 *C4*		6.30 *C4*		
	Conteaville, Pa.							4.50 *L4*		6.30 *L4*	6.725 *L4*	
	Conshohocken, Pa.							4.50 *A2*	5.575 *A2*		6.725 *A2*	
	Harrisburg, Pa.							5.10 C3	5.575 C3			
	Hartford, Conn.			6.40 *R3*		7.725 *R3*						
	Johnstown, Pa.	4.65 *B3*	4.65 *B3*		5.575 *B3*		6.80 *B3*	4.50 *B3*		6.30 *B3*	6.725 *B3*	6.25 *B3*
	Fairless, Pa.	4.80 *U1*	4.80 *U1*		5.725 *U1*							
	Newark, N. J.			6.35 *W10*		7.60 *W10*						
	Camden, N. J.			6.35 *P10*								
	Bridgeport, Putnam, Conn.	4.90 *N8*		6.45 *W10*	5.725 *N8*			4.750 *N8*				
	Sparrows Pt., Md.		4.65 *B3*					4.50 *B3*		6.30 *B3*	6.725 *B3*	6.35 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			6.35 *W11* 6.45 *B5,C14*		7.725 *A5,B5*		4.50 *R3*				6.55 *A5, W6*
MIDDLE WEST	Alton, Ill.	4.65 *L1*										6.425 *L1*
	Ashland, Newport, Ky.							4.50 *A7,N5*		6.30 *N5*		
	Canton-Massillon, Mansfield, Ohio	4.75 *R3*		5.90 *R2,R3*	5.575 *R3,T5*	7.425 *R2,R3, T5*		4.50 *E2*				
	Chicago, Joliet, Ill.	4.65 *U1, N4,W8,R3, P13*	4.65 *N4,R3, P13*	5.90 *A5,W10, W8,B5,L2*	5.575 *U1,R3, W8*	7.425 *A5,W8, W10,L2,B5*		4.50 *U1,W8, I3,A1,R3*	5.575 *U1*	6.30 *U1*	6.725 *U1*	6.25 *A5, R3,N4,W7*
	Cleveland, Ohio	4.65 *R3*	4.65 *R3*	5.90 *A5,C13*		7.425 *A5,C13*	6.80 *R3*	4.60 *J3, R5*	5.575 *J3*		6.80 *R3 J3*	6.25 *A5, C13*
	Detroit, Mich.	4.75 *G3*	4.75 *G3*	5.90 *R5* 6.10 *B5,P8* 6.15 *P3*	5.575 *R5* 5.675 *G3*	7.425 *R5* 7.625 *B5,P3 P8*	6.90 *G3*	4.60 *G3*			6.825 *G3*	
	Duluth, Minn.											6.25 *A5*
	Gary, Ind. Harbor, Crawfordsville	4.65 *I3, U1, Y1*	4.65 *I3, U1, Y1*	5.90 *M5,R3*	5.575 *I3, U1, Y1*	7.425 *M5, R3*	6.80 *U1,I3, Y1*	4.50 *I3, U1,Y1*	5.575 *I3*	6.30 *U1,Y1*	6.725 *U1,I3, Y1*	6.35 *M4*
	Granite City, Ill.							4.70 *G2*				
	Kokomo, Ind.											6.35 *C9*
	Sterling, Ill.	4.75 *N4*	4.75 *N4*									6.35 *N4*
	Niles, Warren, Ohio Sharon, Pa.	4.65 *R3,C10*		5.90 *C10*	5.575 *C10*	7.425 *C10*	6.80 *R3*	4.50 *S1,R3*		6.30 *S1*	6.725 *S1*	
	Pittsburgh, Pa. Midland, Pa.	4.65 *J3, U1, C11*	4.65 *J3, U1*	5.90 *A5,C8, C11,J3, W10,B4,R3*	5.575 *U1,C11*	7.425 *A5,C11, W10,C8,R3*	6.80 *J3, U1*	4.50 *J3, U1*	5.575 *U1*	6.30 *U1*	6.725 *J3, U1*	6.25 *A5,J3, P6*
	Portsmouth, Ohio											6.25 *P7*
	Weirton, Wheeling, Follansbee, W. Va.	4.65 *W3*						4.50 *W3,W9*				
	Youngstown, Ohio	4.65 *U1,Y1, C10,R3*	4.65 *U1,Y1, R3*	5.90 *Y1, U1*	5.575 *U1,Y1, C10*	7.425 *Y1,C10* 7.665 *F2*	6.80 *U1,Y1*	4.50 *U1,Y1, R3*		6.30 *Y1*	6.725 *Y1*	6.25 *Y1*
WEST	Emeryville, Cal.	5.40 *J5*	5.40 *J5*									
	Fontana, Cal.	5.35 *K1*	5.35 *K1*		6.625 *K1*		7.50 *K1*	5.825 *K1*		6.95 *K1*	7.375 *K1*	
	Geneva, Utah							4.50 *C7*			6.725 *C7*	
	Kansas City, Mo.	4.90 *S2*	4.90 *S2*		5.825 *S2*		7.05 *S2*					6.50 *S2*
	Los Angeles, Torrance, Cal.	5.35 *B2,C7*	5.35 *B2,C7*	7.35 *R5*	6.625 *B2*		7.50 *B2*				7.625 *B2*	7.20 *B2*
	Minnequa, Colo.	5.10 C6	5.10 C6					5.35 C6				6.50 *C6*
	Portland, Ore.	5.40 *O2*	5.40 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	5.35 *C7* 5.40 *B2,P9*	5.35 *C7* 5.40 *B2,P9*				7.55 *B2*					7.20 *C7*
	Seattle, Wash.	5.40 *B2,P12, N6*	5.40 *B2,P12*				7.55 *B2*	5.40 *R2*		7.20 *B2*	7.625 *B2*	
SOUTH	Atlanta, Ga.	4.85 *A8*	4.85 *A8*									6.45 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	4.65 *T2,C16, R3*	4.65 *T2,C16, R3*				6.80 *T2*	4.50 *T2,R3*			6.725 *T2*	6.25 *R3, T2*
	Houston, Ft. Worth, Lone Star, Tex.	4.90 *S2*	4.90 *S2*		5.825 *S2*		7.05 *S2*	4.60 *L3, S2*		6.40 *S2*	6.825 *S2*	6.50 *S2*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metal Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace Inc., Chester, Pa.

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.
D5 Henry Disston & Sons, Inc., Philadelphia

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Div., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N5 Newport Steel Corp., Newport, Ky.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P12 Pacific Steel Rolling Mills, Seattle
P13 Phoenix Mfg. Co., Joliet, Ill.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw & Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W11 Worcester Pressed Steel Co., Worcester, Mass.

Y1 Youngstown Sheet & Tube Co., Youngstown

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
STANDARD T. & C.																						
Sparrows Pt. *B3*	15.50	6.25	18.50	4.25	21.00	7.75	23.50	8.50	24.00	9.50	24.50	10.00	26.00	9.75								
Youngstown *R3*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75								
Fontana *K1*	6.00	+9.25	9.00	+5.25	11.50	+1.75	14.00	+1.00	14.50	+0.00	15.00	0.50	16.50	0.25								
Pittsburgh *J3*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Alton, Ill. *L1*	15.50	0.25	18.50	4.25	21.00	7.75	23.50	8.50	24.00	9.50	24.50	10.00	26.00	9.75								
Sharon *M3*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75								
Fairless *N2*	15.50	0.25	18.50	4.25	21.00	7.75	23.50	8.50	24.00	9.50	24.50	10.00	26.00	9.75								
Pittsburgh *N1*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Wheeling *W5*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75								
Wheatland *W4*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75								
Youngstown *Y1*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Indiana Harbor *Y1*	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75								
Lorain *N2*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	20.0	6.25	24.00	10.25	26.00	13.75	26.50	12.50	27.00	13.50	27.50	14.00	28.00	12.75								
Youngstown *R3*	22.0	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75								
Fairless *N2*	20.0	6.25	24.00	10.25	26.00	13.75	26.50	12.50	27.00	13.50	27.50	14.00	28.00	12.75								
Fontana *K1*	10.50		14.50		16.50		17.00		17.50		18.00		18.50									
Pittsburgh *J3*	22.00	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Alton, Ill. *L1*	20.0	6.25	24.00	10.25	26.00	13.75	26.50	12.50	27.00	13.50	27.50	14.00	28.00	12.75								
Sharon *M3*	22.0	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75								
Pittsburgh *N1*	22.0	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Wheeling *W5*	22.0	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75								
Wheatland *W4*	22.0	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75								
Youngstown *Y1*	22.0	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Indiana Harbor *Y1*	21.0	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75								
Lorain *N2*	22.0	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75

Threads only, buttweld and seamless 2½ pt higher discount. Plain ends, buttweld and seamless, 3-in. and under, 4½ pt higher discount. Buttweld jobbers discount, 5 pct.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb, East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2 in., 1½ pt.; 2½ and 3-in., 1 pt. e.g., zinc price range of over 11¢ to 13¢ would lower discounts; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 12.50¢ per lb.

Steel Prices *(Effective Aug. 2, 1955)*

To identify producers, see Key on preceding page.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer *U1*	4.725	5.65	5.825				
So. Chicago *R1*				7.90			
Ensley *T1*	4.725	5.65					
Fairfield *T2*		5.65		7.90		5.625	
Gary *U1*	4.725	5.65				5.625	
Ind. Harbor *I3*	4.725		5.825	7.90		5.625	
Johnstown *B3*		5.65					
Joliet *U1*		5.65	5.825				
Kansas City *S2*				7.90			
Lackawanna *B3*	4.725	5.65	5.825			5.625	
Minnequa *C6*	4.725	6.15	5.825	7.90		5.625	12.40
Pittsburgh *O1*							
Pittsburgh *P5*							
Pittsburgh *J3*				7.90			
Seattle *B2*				8.40		5.775	12.90
Steelton *B3*	4.725		5.825			5.625	
Struthers *Y1*				7.90			
Torrance *C7*						5.775	
Williamsport *S5*		5.65					
Youngstown *R3*				7.90			

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field	8.40	8.60	
Armature	9.35	9.60	10.10
Elect.	9.95	10.20	10.70
Motor	10.95	11.20	11.70
Dynamo	11.85	12.10	12.60
Trans. 72	12.80	13.05	13.55
Grain Oriented			
Trans. 65	13.35	Trans. 80	17.45
Trans. 58	13.85	Trans. 73	17.95
Trans. 52	14.85		

Producing points: Beech Bottom *(W5)*; Brackenridge *(A5)*; Granite City *(G2)*; Indiana Harbor *(I3)*; Mansfield *(E2)*; Newport, Ky. *(N5)*; Niles, O. *(N3)*; Vandergrift *(U1)*; Warren, O. *(R5)*; Zanesville *(A7)*.

* Coils 75¢ higher

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Col	Woven Wire Fence 9-15½ ga. Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R5*	152	162		173	175	7.40	7.80
Aliquippa, Pa. *J3*	152	162				7.40	7.80
Atlanta *A6*	154	167		175	180	7.50	8.025
Bartonville *K2**	154	168		175	181	7.50	8.075
Buffalo *W6*						7.40	7.80
Chicago, Ill. *N4**	152	166		173	179	7.40	7.975
Cleveland *A6*							
Cleveland *A5*						7.40	
Crawfordsville *M4**	154	167		175	175	7.50	8.05
Donora, Pa. *A5*	152	162		173	175	7.40	7.80
Duluth *A5*	152	162		173	175	7.40	7.80
Fairfield, Ala. *T2*	152	162		173	175	7.40	7.80
Galveston *D4*	157						
Houston *S2*	167	170			180	7.65	8.05
Johnstown, Pa. *B3**	152	166			175	7.40	7.80
Joliet, Ill. *A5*	152	162		173	175	7.40	7.80
Kokomo, Ind. *C9*	154	164		175	177	7.50	7.90
Los Angeles *B2**						8.35	8.925
Kansas City *S2*	167	174		178	180	7.65	8.05
Minnequa *C6*	157	167	162	178	180	7.65	8.05
Monessen *P6*	152	162				7.40	7.80
Moline, Ill. *R3*							
Pittsburgh, Cal. *C7*	171	185			195	8.35	8.75
Portsmouth *P7*						7.40	
Rankin, Pa. *A5*	152	162			175	7.40	7.80
So. Chicago *R3*	152	162		173	175	7.40	7.80
S. San Francisco *C6*				197	195	8.35	8.75
Sparrows Pt. *B3**	154			175	181	7.50	8.075
Struthers, O. *Y1*						7.40	
Worcester *A5*	158					7.70	
Williamsport, Pa. *S5*			160				

* Galvanized products computed with zinc at 12.5¢ per lb. where indicated. Zinc at 5¢ per lb. for others.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Buffalo, N. Y. *R7*	7.00	8.95	10.50	12.65	15.35
Carnegie, Pa. *S9*		8.95	10.50	12.65	15.35
Cleveland *A5*	7.00	8.95	10.50	12.65	15.35
Detroit *D1*	7.10	9.05	10.60	12.75	
Detroit *D2*	7.10	9.05	10.60		
Harrison, N. J. *C11*			10.80	12.95	15.65
Indianapolis *C5*			10.50	12.65	15.35
New Castle, Pa. *B4*	7.00	8.95	10.50	12.65	
New Haven, Conn. *D1*	7.45	9.25	10.80	12.95	
Pawtucket, R. I. *N7*	7.55	9.25	10.80	12.95	15.65
Pittsburgh *S7*	7.00	8.95	10.50	12.65	15.35
Riverdale, Ill. *A1*	7.10	8.95	10.50	12.65	15.35
Sharon, Pa. *S1*	7.00	8.95	10.50	12.65	15.35
Trenton *R4*					
Wallingford *W1*	7.45	9.25	10.80	12.95	15.65
Warren, Ohio *T4*					
Weirton, W. Va. *W3*	7.10	8.95	10.50		
Worcester, Mass. *A5*	7.85	9.25	10.80	12.95	15.65
Youngstown *C3*	7.10	8.95	10.50	12.65	15.35

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	30.87	36.51	29.94	
	2½	12	41.57	49.16	40.31	
	3	12	47.99	56.76	46.54	
	3½	11	56.03	66.27	54.34	
	4	10	74.41	88.00	72.16	
National Tube	2	13	30.87	36.51	29.94	
	2½	12	42.57	49.16	40.31	
	3	12	47.99	56.76	46.54	
	3½	11	56.03	66.27	54.34	
	4	10	74.41	88.00	72.16	
Pittsburgh Steel	2	13	30.87	36.51		
	2½	12	41.57	49.16		
	3	12	47.99	56.76		
	3½	11	56.03	66.27		
	4	10	74.41	88.00		

WAREHOUSES

Base price, f.o.b., dollars per 100 lb.

Cities	City Delivery Charge	Sheets: Hot-Rolled	Sheets: Cold-Rolled	Sheets: Galvanized (10 gage)	Strip: Hot-Rolled	Strip: Cold-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Baltimore	$.10	7.03	8.32	8.95-9.10	7.65		7.21	7.93	7.61	8.62	14.38	13.44-13.96	16.36	16.29-16.49
Birmingham	.20	6.70	7.80	8.85	6.95			7.90	7.60	9.35				
Boston	.10	7.70	8.81	10.27	7.94-7.96	10.50	7.89	8.13	7.83	9.53	13.65-13.80	13.40-13.45	16.65	16.50
Buffalo	.30	6.80	7.90-8.05	9.70-9.77	7.15		7.15	7.40	7.10	7.90		13.10		16.15
Chicago	.25	6.80	7.93	8.50	7.06		6.99	7.28	7.08	7.75	13.20	12.85	16.05	15.90
Cincinnati	.25	6.92	7.92	8.90	7.30		7.28	7.75	7.32	8.05	13.44	13.09	16.29	16.14
Cleveland	.30	6.80	7.93	8.85	7.16		7.16	7.61	7.14	7.85		12.91		15.96
Denver		8.60	10.00	11.22	8.90		8.60	8.75	8.90	9.82				17.97
Detroit	.25	6.99	8.12	8.78	7.34	8.15	7.27	7.75	7.36	8.04	13.40	13.05	16.25	16.10
Houston		7.85	8.75	10.49	8.15		7.80	8.20	8.25	9.85-9.95		14.00		17.85
Kansas City	.20	7.47	8.60	9.17	7.73		7.66	7.95	7.75	8.52		13.52		
Los Angeles	.10	8.05	10.00	11.00	8.35		8.05	8.30	8.05	11.25		14.25		17.85
Memphis	.10	7.12	8.25		7.38		7.31	7.60	7.40	9.15				
Milwaukee	.25	6.89	8.02	8.59	7.15		7.08	7.45	7.17	7.94		12.94		15.99
New Orleans	.15	7.35	8.50		7.60		7.55	7.85	7.65	9.65				
New York	.10	7.46	8.68	9.44	8.07		7.76	7.99	7.96	9.48		13.28		16.33
Norfolk	.20	7.25			7.65		7.45	7.95	7.65	9.50				
Philadelphia	.10	7.14	8.42-9.02	9.35	7.67		7.37	7.74	7.64	8.46	13.51	13.16	16.36	16.21
Pittsburgh	.25	6.80	7.93	9.20	7.16	9.00	6.99	7.28	7.08	7.85	13.20	12.85	16.05	15.90
Portland	.10	7.80	8.80	10.65	8.00		7.75	7.85-8.15	7.95	11.80		15.00		17.50
Salt Lake City	.20		10.60		9.35			9.20	9.15					
San Francisco	.10	8.10	9.65	10.15	8.35		8.05	8.25	8.05	11.20[3]		14.25		17.85
Seattle	.00	8.55	10.40	10.80	8.65		8.20	8.30	8.35	11.70		14.60		17.65
St. Louis	.25	7.00	8.22	9.19	7.35	11.33	7.28	7.68	7.37	8.14	13.49	13.14	16.35	16.19-16.41
St. Paul	.25	7.46	8.59	9.16	7.72		7.65	7.94	7.74	8.51		13.51		16.56

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.

Exceptions: (1) 1500 to 9999 lb. (2) 1000 lb or over. (3) $.25 delivery. (4) 1000 to 1999 lb. $.25 delivery.

* Plus analysis charge.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb
18	4	1	—	—	$1.60
18	4	1	—	5	2.305
18	4	2	—	—	1.765
1.5	4	1.5	8	—	.96
6	4	3	6	—	1.35
6	4	2	5	—	1.105

High-carbon chromium	.77
Oil hardened manganese	.43
Special carbon	.29
Extra carbon	.33
Regular carbon	.275

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb, f.o.b.

	Cladding	Plate (A3, J2, L4) 10 pct	Plate (A3, J2, L4) 15 pct	Plate (A3, J2, L4) 20 pct	Sheet (I2) 20 pct
Stainless Type	304	30.30	33.15	36.05	32.50
	316	35.50	38.45	41.40	47.00
	321	32.60	34.85	37.75	37.25
	347	34.40	37.90	41.40	46.25
	405	25.80	29.60	33.35	.....
	410, 430	25.30	29.10	32.85	.....

LAKE SUPERIOR ORES

51.50% Fe; natural content, delivered lower Lake ports. Prices effective for 1955 season.

	Gross Ton
Openhearth lump	$11.25
Old range, bessemer	10.40
Old range, nonbessemer	10.25
Mesabi, bessemer	10.25
Mesabi, nonbessemer	10.10
High phosphorus	10.00

COKE

Furnace, beehive (f.o.b. oven) Connellsville, Pa.	Net-Ton $13.00 to $13.50
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$16.00 to $16.50
Foundry, oven coke	
Buffalo, del'd	$28.05
Chicago, f.o.b.	24.50
Detroit, f.o.b.	25.50
New England, del'd	26.05
Seaboard, N. J., f.o.b.	24.50
Philadelphia, f.o.b.	24.00
Swedeland, Pa., f.o.b.	24.00
Plainesville, Ohio, f.o.b.	25.50
Erie, Pa., f.o.b.	25.00
Cleveland, del'd	27.43
Cincinnati, del'd	26.56
St. Paul, f.o.b.	23.75
St. Louis, f.o.b.	26.00
Birmingham, f.o.b.	22.65
Lone Star, Tex., f.o.b.	18.50

ELECTRODES

Cents per lb, f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (in.)	Length (in.)	Price	CARBON* Diam. (in.)	Length (in.)	Price
24	84	22.00	40	110	10.80
20	72	21.25	40	100, 110	9.80
18 to 16	72	21.00	30	110	9.50
14	72	22.00	30	110	9.80
12	72	22.25	24	72 to 84	9.80
3 to 10	60	22.75	20	90	9.60
7	60	23.00	17	72	9.95
6	60	25.50	14	72	10.25
4	40	25.50	10, 12	60	11.10
3	40	30.00	8	60	11.40
2½	30	30.75			
2	24	47.75			

* Prices shown cover carbon nipples.

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolts

	Discount Less Case	Discount C.
½ in. & smaller x 4 in. & shorter	2	22
½ in. & smaller x 6 in. & shorter	+3	18
9/16 in. & ⅝ in. x 6 in. & shorter	+4	17
¾ in. & larger x 6 in. & shorter	+6	15
All diam. longer than 6 in.	+15	8
½ in. & smaller x 6 in. & shorter	+3	18
Lag, all diam. x 6 in. & shorter	6	25
Lag, all diam. longer than 6 in.	+2	19
Plow bolts	23	23

Nuts, H.P., C.P., reg. & hvy.

	Base Discount	Discount, Case or Keg
¾" or smaller	55	64
⅞" to 1¼" inclusive	58	66
1⅜" to 1½" inclusive	60	67½

C.P. Hex. regular & hvy.

All sizes	55	64

Hot Galv Nuts (all types)

¾" or smaller	38	50
⅞" to 1½" inclusive	41	52½

Finished, Semi-finished, Slotted or Castellated Nuts

All sizes	55 / 66

Rivets

	Base per 100 lb
½ in. & larger	$9.25
	Pct Off List
7/16 in. and smaller	37

Cap Screws

	Discount Bright	Discount H.C. Heat Treated
New std. hex head, packaged ⅝" x 6" and smaller and shorter	38	28
¾", ⅞", 1" x 6" and shorter	15	1
New std. hex head, bulk* ⅝" x 6" and smaller and shorter	50	42
¾", ⅞", 1" x 6" and shorter	32	21

*Minimum quantity per item:
15,000 pieces ¼", 5/16", ⅜" diam.
5,000 pieces 7/16", ½", 9/16", ⅝" diam.
2,000 pieces ¾", ⅞", 1" diam.

Machine Screws & Stove Bolts

		Discount Mach. Screws	Stove Bolts
Packaged, package list		33	43
Bulk, bulk list			
	Quantity		
¼-in. & smaller	15,000- 99,999	17	59
diam.	100,000-199,999	25	62
& under	200,000 & over	33	67
5/16-in.	15,000- 49,999	17	59
diam. &	50,000- 99,999	25	62
larger	100,000 & over	33	67
All diam.	5,000- 49,999	..	59
over 3 in.	50,000- 99,999	..	62
long	100,000 & over	..	67

Machine Screw & Stove Bolt Nuts

		Discount Hex	Square
Packaged, package list		30	33
Bulk, bulk list			
	Quantity		
⅜-in.	15,000- 99,999	15	17
diam. &	100,000-199,999	23	25
smaller	200,000 & over	31	33

REFRACTORIES

Fire Clay Brick

Carloads per 1000

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00)	$122.00
No. 1 Ohio	.....
Sec. quality, Pa., Md., Ky., Mo., Ill.	114.00
No. 2 Ohio	.....
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	18.00

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$128.00
Childs, Hays, Pa.	133.00
Chicago District	138.00
Western Utah	.....
California	.....
Super Duty Hays, Pa., Athens, Tex., Windham	145.00
Curtner, Calif.	163.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	21.00
Silica cement, net ton, bulk, Hays, Pa.	24.00
Silica cement, net ton, bulk, Chicago District, Ensley, Ala.	22.00
Silica cement, net ton, bulk, Utah and Calif.	.....

Chrome Brick

Per net ton

Standard chemically bonded, Balt.	$86.00
Standards chemically bonded, Curtner, Calif.	96.25
Burned, Balt.	80.00

Magnesite Brick

Standard Baltimore	$109.00
Chemically bonded, Baltimore	97.50

Grain Magnesite

St. ⅝-in., grains

Domestic, f.o.b. Baltimore in bulk fines removed	$64.40
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	40.00
in sacks	46.00

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in: Pa., W. Va., Ohio	$15.00
Midwest	....
Missouri Valley	....

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	11.25¢
Canadian sponge iron, Del'd in East, carloads	9.5¢ / 10.75¢
Domestic sponge iron, 98+% Fe, carload lots	9.5¢
Electrolytic iron, annealed, imported 99.5+% Fe	37.5¢
domestic 99.5+% Fe	36.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	53.5¢
Hydrogen reduced iron minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 00.8+% Fe	83.0¢ to $1.43
Aluminum	31.5¢
Brass, 10 ton lots	29.50¢ to 36.50¢
Copper, electrolytic	57.75¢
Copper, reduced	57.75¢
Cadmium, 100-199 lb. 95¢ plus metal value	
Chromium, electrolytic, 99% min., and quality, del'd	$3.60
Lead	23.50¢
Manganese	57.0¢
Molybdenum, 99%	$2.75
Nickel, unannealed	89.50¢
Nickel, annealed	96.50¢
Nickel, spherical, unannealed	93.50¢
Silicon	43.50¢
Solder powder 7.0¢ to 9.0¢ plus met. value	
Stainless steel, 302	91.0¢
Stainless steel, 316	$1.10
Tin	14.04¢ plus metal value
Tungsten, 99% (65 mesh)	$4.95
Zinc, 10 ton lots	17.5¢ to 25.5¢

Ferroalloy Prices

(Effective Aug. 2, 1955)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd, 65-72% Cr, 2% max Si.

0.025% C .. 36.00	0.15% C ... 33.75	
0.025% C, Simplex .. 34.50	0.20% C ... 33.50	0.50% C ... 33.25
0.06% C ... 34.50	1.00% C ... 33.00	
0.10% C ... 34.00	2.00% C ... 32.75	

65-69% Cr, 4-9% C 24.75
62-66% Cr, 4-6% C, 6.9% Si 25.60

S. M. Ferrochrome

Contract prices, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60.55% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	25.85
Ton lots	28.00
Less ton lots	29.50

High Nitrogen Ferrochrome

Low-carbon type 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.18
0.50% max. C	1.16
9 to 11% C	1.25

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed, lump 4-in. x down, 24.75¢ per lb contained Cr plus 12.00¢ per lb contained Si. Bulk 2-in. x down, 25.05¢ per lb contained Cr plus 10.80¢ per lb contained Si. Bulk 1-in. x down, 25.25¢ per lb contained Cr plus 11.00¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, lump, delivered.

30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads	19.00
Ton lots	22.10
Less ton lots	23.60

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	20.00
Ton lots	22.30
Less ton lots	23.30

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots	17.50
Less ton lots	19.50

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5: 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	16.60
Ton lots	18.10
Less ton lots	19.35

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	17.50
Ton lots to carload packed	18.50
Less ton lots	20.00

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	9.50
Clairton, Pa.	9.50
Sheridan, Pa.	9.50
Philo, Ohio	9.50

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	11.85
Ton lots packed	13.65

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$84.00
19 to 21%	3% max.	86.00
21 to 23%	3% max.	88.50
23 to 25%	3% max.	91.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.00
Ton lots	43.50

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	30.00
Ton lots	32.00
250 to 1999 lb	34.00
Premium for hydrogen-removed metal	0.75

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn ..... 21.35¢

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	32.00	33.85	35.05
0.07% max. C	29.95	31.80	32.80
0.15% max. C	28.45	30.30	31.50
0.30% max. C	26.95	28.80	30.00
0.50% max. C	26.45	28.30	29.50
0.75% max. C, 80-85% Mn, 5.0-7.0% Si	23.45	25.30	26.50

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢.

Carload bulk	11.00
Ton lots	12.65
Briquet contract basis carlots, bulk, delivered, per lb of briquet	12.45
Ton lots, packed	14.25

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $85.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $88.00. Add $1.00 per ton for each additional 0.50% Si up to and including 17%. Add $1.45 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton lots	Carloads
96% Si, 2% Fe	20.10	18.00
97% Si, 1% Fe	20.60	18.50

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk	6.55
Ton lots	8.35

Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, delivered.

25% Si	20.00	75% Si	14.40
50% Si	12.00	85% Si	16.10
65% Si	13.50	90% Si	17.25

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.65	$2.95	$3.75
Less ton lots	2.40	2.30	4.55

Ferrovanadium

35-55% contract, basis, delivered, per pound, contained V.

Openhearth	$3.00-$3.10
Crucible	3.10- 3.20
High speed steel (Primos)	3.20- 3.25

Alsifer, 20% Al, 40% Si, 40% Fe. Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	9.25¢
Ton lots	10.15

Calcium molybdate, 45.5-46.5% f.o.b. Langeloth, Pa., per pound contained Mo $1.35

Ferrocolumbium, 50-60%, 2 in. x D contract basis, delivered per pound contained Cb.

Ton lots	$6.90
Less ton lots	6.95

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, contract basis, del'd, ton lots, 2-in. x D per lb con't Cb plus Ta..... $4.65

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.46

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton..... $90.00
10 tons to less carload..... $110.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti..... $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti..... $1.50
Less ton lots..... $1.55

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton..... $177.00

Ferrotungsten, ¼ x down, packed, per pound contained W, ton lots, f.o.b..... $3.80

Molybdic oxide, briquets, per lb contained Mo, f.o.b. Langeloth, Pa. $1.27
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.24

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b Philo, Ohio, freight allowed, per lb.

Carload, bulk lump	15.50¢
Ton lots, packed lump	16.75¢
Less ton lots, lump, packed	17.25¢

Vanadium Pentoxide, 86 - 89% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.28

Zirconium, contract basis, per lb of alloy.

35-40%, f.o.b. freight allowed, ton lots	26.00¢
12-15%, del'd, lump, bulk-carloads	8.00¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed. B, 3.14%, Si, 40-45%, per lb contained B.... $5.25

Bortam, f.o.b. Niagara Falls

Ton lots, per pound	45¢
Less ton lots, per pound	50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.

Ton lots per pound	10.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in., x D, Ton lots... $1.20
F.o.b. Wash., Pa.; 100 lb up

10 to 14% B	.85
14 to 19% B	1.20
19% min. B	1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over

No. 1	$1.00
No. 6	63¢
No. 79	50¢

Manganese - Boron, 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots	$1.46
Less ton lots	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots..... $2.05

Silcaz, contract basis, delivered.

Ton lots	45.00¢

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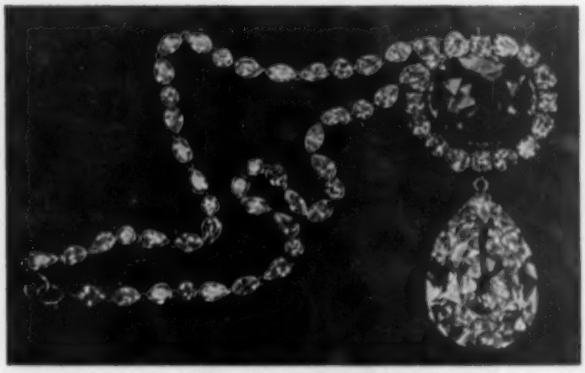

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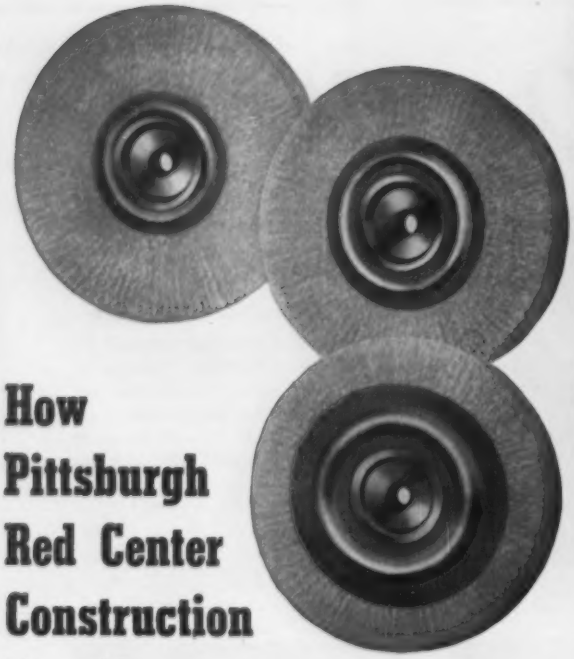

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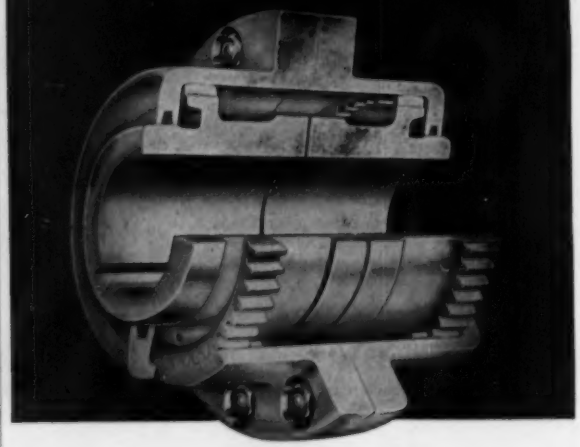

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A WILLIAMS-WHITE Gantry Type, Hydraulic Press can be built to your specifications for operations as diversified as straightening heavy plate or weldments (photograph 5500) or production bending and straightening operations (photograph 5323).

	5500→
Capacity	400 tons
Working face of bed, R-L, F-B	20' x 13'
Daylight, bottom of ram to bed	48"
Stroke	24"
Cross travel of hydraulic ram	130"
Longitudinal travel of gantry	15'

	5323→
Capacity	75 tons
Bed, length and width	144" x 22"
Daylight	26"
Stroke	12"

For additional information regarding WILLIAMS-WHITE Production Machinery, write for BULLETIN 203.

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THE CLEARING HOUSE

News of Used and Rebuilt Machinery

Detroit Demand Grows . . . Demand for used machines has increased quite a bit in Detroit during the last month and has led dealers to predict that the amount of business this year will certainly surpass 1954, but only in dollar volume, not in profit.

Dealers can't put their finger on the reason profits are not keeping pace with the increased sales but they are happy just for the boost in business.

Optimism is pervading the market despite the profit picture. One reason for the rosy outlook is that the first 6 months of this year were much better from a sales standpoint than the same period in 1954.

Wage Gains Help . . . Then too, dealers feel that the recent increase in the price of steel, plus the wage gains recently won by organized labor are going to give their business a definite shot in the arm.

The reasoning is that cost increases are going to lead to price increases for new machines possibly as high as 10 pct. This alone is going to force more and more customers to go shopping for used equipment.

At the same time, small job shops are going to find that their own operating costs have increased and will naturally seek ways and means to save money.

Prepare For Cars . . . Evidence that small suppliers are getting ready for 1956 cars continues to pile up. The demand for all types of tool room equipment is very good. Dealers report a lot of inquiries for vertical surface grinders. Lathes, mills and shapers are also in good demand. One of the hottest items is punch presses. Some used machinery people say that the demand here was unexpected and so they have been caught short. Universal grinders are also on the scarce list.

Find Right Machines . . . Despite the spotty inventory picture, dealers are not having too much trouble supplying their customers with the proper machines. They have become accustomed to the fact that "newer" used machinery is always somewhat of a scarce item and have accepted it as an economic fact.

In some cases, customers have been satisfied with a rebuilt and reconditioned machine when they find they can't get precisely what they want.

Generally, no one in Detroit is complaining about a lack of business and all predict that it is going to get increasingly better.

National Picture Varys . . . Business nationally seems to be holding up fairly well going into the summer. Some sections and some lines are lagging but dealers are encouraged by the showing this year so far.

Talk of summer slackness was rejected entirely by one Eastern dealer specializing in fabricating equipment. He reports shears, heavy duty hydraulic presses and other big items are still moving well and called the idea of a summer letdown an outmoded myth. Vacation trips tend to have a little business squeezed in, he says, and activity is better now than it was in the spring.

The pattern of past years calls for a strong first quarter, a tapering off into the summer and a moderate recovery in the last quarter. With the overall economy booming and with the Machine Tool Show stirring special interest, 1955 could cause a revision in seasonal thinking.

Speaking of the show, arrangements for the Machinery Dealers National Assn. booth (No. 750) are well in hand. Exhibit will be set up along professional, institutional lines. Displays will present the case for used machinery.

CONSIDER GOOD USED EQUIPMENT FIRST

ANGLE BENDING ROLL
1⅝ x 1⅝ x ¼" Niagara No. 3 Angle Bending Roll Motor Driven Incl. Motor. NEW 1945

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8' x 3/16" Bertsch Initial Type
8' x ⅜" Webb 9L-3 Initial Type
12' x ¼" Hilles & Jones Pyramid Type
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16' x ¼" Bertsch Initial Type Bending Roll
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BRAKES—LEAF TYPE
8' x ¼" Dreis & Krump Size 186
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BRAKES—PRESS TYPE
12' All Steel Press Brake, 250 ton Capacity
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Clyde Double Drum Electric Car Puller, Capacity 43,750# Max. Starting Pull

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10 ton P&H	35' Span 230 Volt D.C.
10 ton Niles	52' Span 230 Volt D.C.
10 ton Shaw	72' Span 230 Volt D.C.
10 ton Northern	75' Span 230 Volt D.C.
125 ton Cleveland	85' Span 230 Volt D.C.

With 2 Trolley 62½ ton & 10 ton Aux.

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25 ton Henry & Wright, 1½" Stroke, Double Roll Feed, Scrap Shear

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50,000# Standard Double Draw, 48' Length of Draw
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1257 ton Baldwin Southwark Forging Press, 30" Stroke Main Ram, 54" x 41" Bet. Columns
1300 ton Lake Erie 4-Column, 36" Stroke 48x48" Bet. Columns, 12' RtoL Overall of Bed

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#6½A Niagara, 150 ton, 12" Stroke
Cleveland, 125 ton, 12" Stroke

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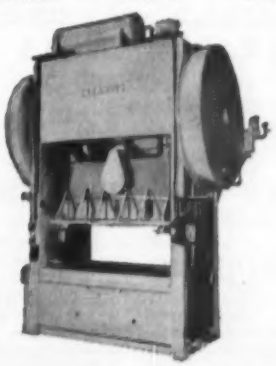

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700	*Westg.	CB	1200
700	A.-Ch.	AN	900
500	*A.-Ch.	6316-8W	1800
500	G.E.	KT-424	450
400	G.E.	KT-424	360
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300	*G.E.	K-6344Y	1200
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1	1500	G.E.	514	250	13,200/6600
3	1300	Whse.	720	600	2300
1	1000	G.E.	900	250	2300
3	1000	Whse.	514	600	11,000/6600
1	500	C.W.	720	575/600	2300/440
3	400	Whse.	1200	125/250	2300
1	450	C.W.	720	250	2300/440
1	400	C.W.	1200	125/250	2300/440
3	300	G.E.	900	125/250	2300
1	200	Whse.	1200	600	2300/440
1	150	G.E.	720	250	2300/440
1	100	Whse.	900	250	2300
1	100	C.W.	1200	125	440/230
1	800	Whse.	1200	250	4160

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Qu.	H.P.	Make	Type	Volts	R.P.M.
2*	3000	Whse.	Rmtl.	525	600
1	2000	Whse.	Mill	600	220/440
6	1500	Whse.	Rmtl.	525	600
1	1200	G.E.	MUF-4	600	350/700
4	800	Whse.	Rmtl.	525	600
1	800	Whse.	Mill	300	250/550
6	700	Whse.	Rmtl.	250	300/700
3	540	Whse.	Mill	550	385/710
1	350	G.E.	CD-180-A	230	1150
1	250	G.E.	MPC	230	325/975
1	250	G.E.	MCF	600	300/685
1	200/280	Bl. Dy.	6-35	230	400/1200
1	200	Whse.	Mill	230	300/1200
1	200	G.E.	MDP-430	250	350/610
1	180	G.E.	MPC	250	500
1	150	Whse.	8K-201	230	300/900
3	135	Whse.	8K-184	230	575/880
1	125	Whse.	8K-190	600	600
1	125	G.E.	MPC-6	230	585/836
1	90/180	G.E.	MPC	250	835/1125
4	100	Bl. Dy.	6-30	250	450/1350
9	75	C.W.	80-H	230	860
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1	40	G.E.	CD-132	230	500/1900
1	35	Whse.	8K	230	350/1600
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1	1500	ABB		2300	720
2	1000	A.C.	MIII	2300	240
1	800	G.E.	MT	2300	292
1	700	A.C.		2300	300
1	500	G.E.	M-574Y	4000	900
1	500	G.E.	MT-413	2300	580
1	500	Whse.	CW	550	550
1	400	Whse.	CW-348A	440	1170
1	400	Whse.	CW	440	514
1	400	Whse.	CW-1313	2200	435
1	350	G.E.	MT-443Y	2200/4000	253
2	300	G.E.	IM-17A	440/2200	720
1	250	G.E.	MT-424Y	4000	257
1	250	G.E.	MT-5098	2200	1800
1	250	Al. Ch.		550	600
1	200	Cr. Wh.	26QB	440	505
1	200	G.E.	IM	440	435
1	150 (unused)	Whse.	CW	2200	435
2	125	A.C.		440	865
1	125	Al. Ch.		440	720
1	100	G.E.	IM-16	2200	435
1	100	G.E.	IM	440	600
4	100	A.C.	ANY	440	695

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1	500	G.E.	K-6545-R	2300	1185
2	450	Whse.	CR-1420	2200/4150	354
1	400	G.E.	IE-15B	2200	1145
1	400	G.E.	IE	2200	500
1	200	G.E.	IK-17	440	580
3	200	G.E.	KT-557	440	1800
1	150/75	G.E.	IK	440/900/450	
1	150	Whse.	CR-8568	440	880
1	150	Whse.	CR	440	580
2	125	Al. Ch.	ARW	2200	1750
1	100	Whse.	CR-876C-TEFC	440	710

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2	2000	Whse.		2300	120
2	1750	G.E.	ATI	2300	3600
3	735	G.E.	ATI	2300/12000	600
1	500	Ideal	SM	2300/6100	1800
3	400	G.E.	TS-7567	2200	1200
1	450	Whse.		2200	128.5
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METALLURGIST—Immediate opening available in medium size electric steel jobbing foundry located in Louisiana. Must be experienced in carbon and low alloy steel, capable of taking complete charge of melting department as well as chemical and physical testing laboratory. Also require some knowledge of cast iron. Please reply giving age, past experience, etc. All replies will be kept strictly confidential. Address Box G-114, care *The Iron Age*, 100 E. 42nd St., New York 17.

HELP WANTED

BUYER—Mechanical, for prominent mid-western steel company. Excellent opportunity for experienced steel mill buyer of mill and furnace equipment including spares, repairs and supplies; conveyors, forgings, castings, machining, etc. Our buyers know of this ad; all replies confidential. Address Box G-113, care *The Iron Age*, 100 E. 42nd St., New York 17.

DRAFTSMAN—EXPERIENCED—Structural Steel & Light Iron—Small shop in beautiful New England city—unusual opportunity. Address Box G-108, care *The Iron Age*, 100 E. 42nd St., New York 17.

SITUATIONS WANTED

PRODUCTION EXECUTIVE—EMPLOYED AS GEN. SUPT. EXPERIENCED IN INDUSTRIAL AND PLANT ENGINEERING AND LABOR RELATIONS. BSME, MBA, AGE 37. DESIRES PLANT MANAGER OR SIMILAR POSITION. RESUMÉ ON REQUEST. ADDRESS BOX G-111, CARE *THE IRON AGE*, 100 E. 42ND ST., NEW YORK 17.

MECHANICAL ENGINEER with excellent background in machining and machining research, supervision, and sales, desires responsible position in sales, field consultation, or machining research. Experienced in titanium, difficult metals, honeycomb, etc. Age 44. Single. Extended travel no handicap. Prefer west or southwest but will accept congenial position anywhere. Address Box G-109, care *The Iron Age*, 100 E. 42nd St., New York 17.

PURCHASING AGENT with Engineering ability necessary to direct analytical and economical Purchasing Program seeks challenging opportunity in progressive metal working company. Graduate Mechanical Engineer. Over 15 years varied Engineering and overall plant buying experience. Age 40. Chicago area preferred. Address Box G-112, care *The Iron Age*, 100 E. 42nd St., New York 17.

GENERAL MELTER FOREMAN 18 years electric furnace and metallurgical experience. All types of melting and all grades including super alloys. Strong metallurgical and cost background. Expert in stainless and tool. Seeks wider responsibility and challenge. Address Box G-110, care *The Iron Age*, 100 E. 42nd St., New York 17.

SUPERINTENDENT ROLLING MILLS—over twenty years diversified experience Engineering and Roll Pass Design background—Will Relocate—Consider Foreign. Address Box G-115, care *The Iron Age*, 100 E. 42nd St., New York 17.

MANUFACTURER'S REPRESENTATIVE with contacts in the metal working trade. Interested in a product to service the North Jersey and New York Metropolitan area. Address Box G-117, care *The Iron Age*, 100 E. 42nd St. New York 17.

MELTER: ELECTRIC ARC basic and acid experience, making all types alloy steel; capable taking charge melt shop operations. Desires position. Address Box C-999, care *The Iron Age*, 100 E. 42nd St., New York 17.

PLANT SUPT. with a wide range of experience in manufacturing and jobbing would like to make a change. Small plant not over 200 employees preferred. Address Box D-105, care *The Iron Age*, 100 E. 42nd St., New York 17.

ADVERTISERS IN THIS ISSUE

An asterisk (*) beside the name of advertiser indicates that a booklet, or other information, is offered in the advertisement. Write to the manufacturers for your copies today.

ADVERTISERS IN THIS ISSUE

XI

This is the eleventh of a series of advertisements dealing with basic facts about alloy steels. Though much of the information is elementary, we believe it will be of interest to many in this field, including men of broad experience who may find it useful to review fundamentals from time to time.

How Alloy Steels Are Affected by Molybdenum

There is nothing hit-or-miss about the making of alloy steels. Each element in a given analysis is chosen for its ability to do a special job—or to complement the abilities of other elements. Previously in this series of discussions we have briefly outlined the functions of nickel and chromium. This leads us naturally to molybdenum, a highly reliable performer in numerous types of analyses.

Because of its many desirable properties, molybdenum is one of the most respected of all the alloying agents. It is often used in conjunction with chromium, manganese, nickel, cobalt, tungsten, vanadium, or various combinations of these elements.

Molybdenum promotes hardenability in steel, and is useful where close hardenability-control is essential. It increases depth-hardness and widens the range of effective heat-treating temperatures. Moreover, it has a strong tendency to form stable carbides that hamper grain-growth prior to quenching, thus making the steel fine-grained and unusually tough at the various hardness levels.

Another point in favor of molybdenum is its ability to increase the tensile and creep strengths of alloy steels at high temperatures. Still another is its talent for enhancing corrosion-resistance in high-chromium and chromium-nickel steels.

Among the familiar products that frequently contain molybdenum are high-speed cutting tools, forged crankshafts and propeller shafts, turbine rotors, high-pressure boiler plate, high-pressure cylinders, permanent magnets, and armor-piercing projectiles. This is by no means intended as a complete list, but rather as a few typical examples.

If you would like more information about the properties and applications of molybdenum, Bethlehem metallurgists will be glad to help you. Our staff technicians have devoted years of research to the subject, and working with molybdenum is part of their job. As a matter of fact, they are specialists in all types of alloying elements, and all types of alloy steels. When they can be of assistance to you, please feel free to call them.

And call on Bethlehem, too, when in the market for AISI standard steels, special-analysis steels, or carbon grades. Your inquiries will be welcomed, and we can assure you of prompt service.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

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BETHLEHEM STEEL

BETHLEHEM STEEL

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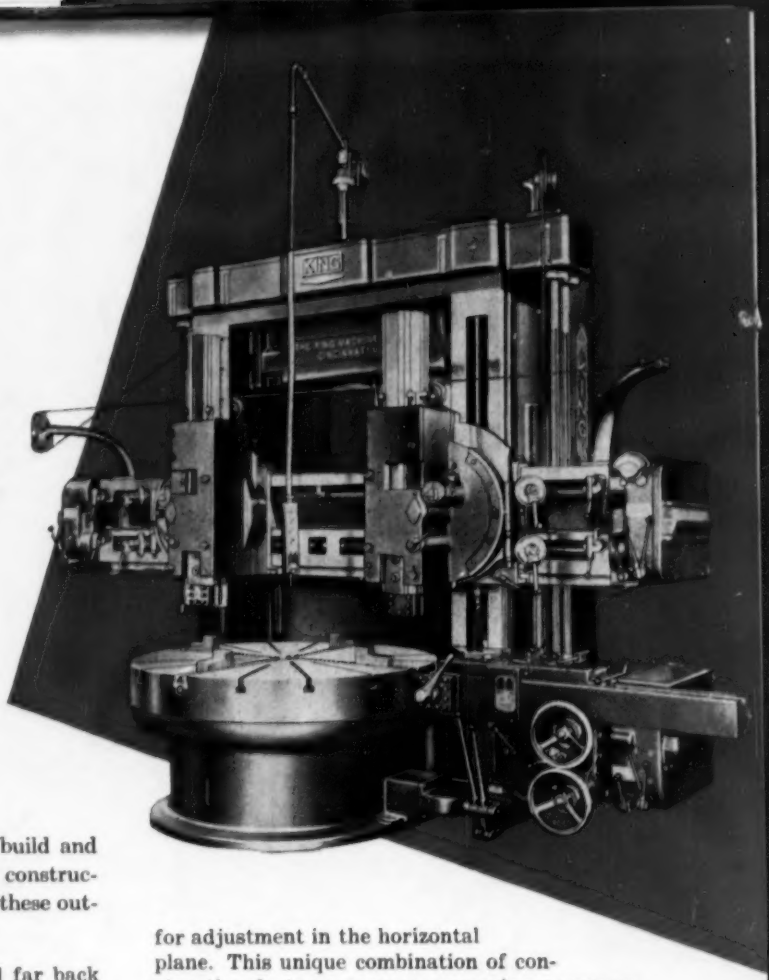
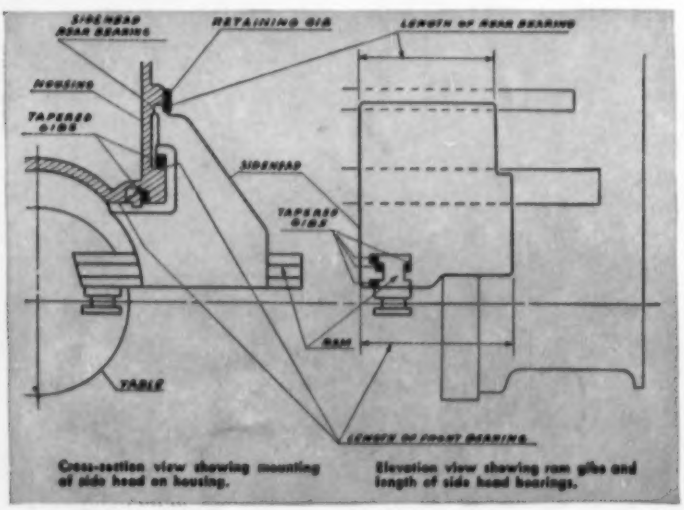


Typical of KING® superiority in rugged build and sturdily maintained rigidity is the side head construction illustrated and described here. Compare these outstanding construction details:

A full-length side head bearing is mounted far back on the side of the machine housing, extending back against the housing and held by a retaining gib. The other side head bearings are sturdily gibbed to the housing guides at all points of possible rotation, using adjustable tapered gibs. The accuracy of the ram within the side head is maintained by adjustable tapered gibs, two for adjustment in the vertical plane and two for adjustment in the horizontal plane. This unique combination of construction features assures unvarying accuracy by maintaining maximum ram and side head rigidity with resultant maximum resistance to deflection of the ram or rotation of the side head in any direction.

Extremely heavy cuts can be taken with the side head at feeds and speeds even beyond the capacity of the best modern cutting tools. Accuracy is maintained under the most severe conditions—such as work on pieces of small diameter in relation to table diameter, where the ram, extended inward, has considerable tendency to cause rotation of the side head.

This kind of *extra quality* construction *throughout* KING machines is your best guarantee of accurate, dependable performance. For full details see your King Distributor, or write us direct.



Cross-section view showing mounting of side head on housing.

Elevation view showing ram gibs and length of side head bearings.

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